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Case Study

Rehabilitation of Tibial shaft Fracture in Post Polio Patient with Limb Length Discrepancy

Priyanka Chugh*, Savita Tamaria, Jyoti Dahiya

Assistant Professor, Banarsidas Chandiwala Institute of Physiotherapy Chandiwala Estate, Maa Anandmai Marg, Kalkaji, New Delhi-110019

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ABSTRACT

Aim: This thesis involves a case study on physiotherapeutic approach to a 23 year old male with closed tibial shaft fracture, 5 months after incident. This case study was conducted in the month of June of 2015 at Banarsidas Chandiwala Institute of Physiotherapy. Materials used during this study included Paraffin Wax Bath, hot water fomentation pads, treatment table, measurement tape, neurological hammer, goniometer, various sized pillows, and balance boards of different shape, Parallel bar, weight cuffs, Continuous Passive Motion (CPM) Machine. Methods: The therapy started with initial kinesiological examination along with the therapeutic methods. To enhance the effects of the therapy, the patient has been in addition required to perform home therapies as instructed during the sessions. Results: The therapies used have shown to be very successful concerning the patients diagnosis.

1. Introduction

World Health Organization (WHO) removed India from the list of 'polio-endemic' countries & it's a matter of pride for all of us. Yet many Post –Polio cases are surviving in India, who are suffering from Physical as well as emotional trauma. Flaccidity is the most common feature found in post polio cases, leading to Non- weight bearing by the lower limb, and hence osteopenia and osteoporosis in bones of L/L. Incidence of fracture increases even with minor trauma. Here is a case study of Post polio patient having limb length discrepancy, who suffered fracture of tibial shaft after slipping on wet floor. We have discussed the problems faced, treatment plan, assessment and treatment outcomes after 3 weeks of physiotherapy rehabilitation.

2. Methodology

This case study was conducted on Mr. Abdul Qadir during the first week of June 2015 to last week of June 2015 in total 3 weeks. The patient came to the physiotherapy department of Banarsidas Chandiwala Institute of physiotherapy with a closed fracture of the Right Proximal shaft of Tibia (ICD-9-CM 823.10)/ (ICD-10-CM S82.209A). The process of the therapy started with initial kinesiological examination followed by 3 weeks long therapy session and a final kinesiological examination. During the examinations and therapies we used the following equipment in the clinic : - Therapeutic Paraffin Wax Bath, hot water fomentation pads, treatment table, measurement tape, neurological hammer, goniometer, various sized pillows, and balance boards of different shape, Parallel bar, weight cuffs, Continuous Passive Motion (CPM) Machine .

Anamnesis

Name of the patient: Abdul Qadir

Age: 23 years

Diagnosis

Closed fracture of the Right proximal Tibial shaft CM S82.209A (ICD-10)

Chief Complaints

Patient complained about limited mobility (Inability to perform Namaz), lack of power in right lower extremity and pain during walking.

History of present problem

Patient suffered a closed fracture while slipping on drenched slippery floor on 01/23/2015. After seeing an orthopedic surgeon,

X-Ray was done, it revealed close (Grade A) fracture of proximal shaft of tibia Patient did not receive surgical treatment, only conservative management was done. A plaster cast was worn until 06/03/2015 and weight bearing was limited. .After removal of plaster cast on 06/03/2015, physical therapy was

***Corresponding author:** Priyanka Chugh, Assistant Professor, Banarsidas Chandiwala Institute of Physiotherapy Chandiwala Estate, Maa Anandmai Marg, Kalkaji, New Delhi-110019, E.mail: *drpriyankachugh2@gmail.com*

prescribed by the Orthopedic Surgeon. Patient started Physical therapy on 6/05/2015 to maintain strength and range of motion.

Problem

Patient was having LLD (Limb Length Discrepancy), the fractured limb was shorter, so, it was not used to weight bearing, moreover all the surrounding muscles were atrophied due to polio, and patient was having immense pain and was not willing to do exercises initially.

Present State

Height: 170 cm
Weight: 72 kg
BMI: 24.9 kg/m^2
It has now been 8 weeks since the incident.
Psychosocial History Work

Living Conditions: Patient lives in a 1 floor house with no stairs and good accessibility to his house.

Family

Has a wife and lives in a joint Family with his Parents and siblings.

Personal and Medical History

Diseases

Known Case of Poliomyelitis, Abdul was healthy when he was born, he suffered from Poliomyelitis at the age of 3 years, after ingesting (OPV) Oral Polio vaccine, According to his family there was a major break out of polio in Bareily, India, after ingesting of OPV by kids.

Operations

The patient had a Hamstring release surgery of Right side from a NGO in Rajasthan 3years back, But No prescriptions and Reports were provided by the latter.

Medications

None

Abuses

Non-smoker, Non-Alcoholic, No Drug Abuse

Differential considerations

Patient's complaint of lack of mobility in right knee can be caused by shortened quadriceps femoris on right leg Furthermore restriction of soft tissues around the leg and mobility of patella should be visible. Lack of power can be muscle atrophy caused by patients cast on his leg as well as the flaccidity due to post –polio.

Initial Kinesiological Examination Postural Examination: Anterior View

Patient 's right limb is shorter by 4inches as compared to left limb. Lateral rotation in left ankle joint, right ankle joint is slightly rotated laterally than left ankle joint - Tibial lateral rotation - Genu Varum - Right patella is higher than left - ASIS are in physiological line.

Lateral View

Slight lordosis on the lumbar spine

Posterior View

Left calcaneas varus – Right calcaneus straight - Height of iliac crest is normal - Patient has bowed legs when asked to put legs together -Dynamic Spine Examination: Forward Bend – Patient was 22cm from touching the ground Backward Bend – Limited mobility of Thoracic Spine SideBend

Gait Examination

Patient was asked to walk with Crutches. Examination of the patients gait showed patient walks with eversion of both ankle joints. He takes small steps. Left ankle joint is fixed in planter flexion, while right ankle joint is moveable but has flexible foot drop. Slight extension of hip joint to maintain the balance. Main problem is muscular strength- Due to Post Polio; there is decreased muscle strength in B/L Lower limb. Slight problem with balancing sideways.

Figure 1. X-Ray 1 Showing Grade A Tibial shaft Fracture, And thinning of bones due to Polio

Figure 2. X Ray 2-Showing Healing of Fracture & callus formation after 5 months of fracture

ROM Measurements

Table 1

S. No.		Passive ROM of Right side	Passive ROM of Left side
1.	Ankle Dorsiflexion	0°-13°	0°
2.	Ankle Planter flexion	0°-26°	Fixed in 50° PF
3.	Inversion	0°-30°	0°-30°
4.	Eversion	0°-25°	0°-25°
5.	Knee Flexion	0°-10°	0°-130°
6.	Knee Extension	10°-0°	130°-0°
7.	Hip Flexion	0°-110°	0°-115°
8.	Hip Extension	110°-0°	115°-0°
9.	Hip Adduction	45°-0°	20°-0°
10.	Hip Abduction	0°-45°	0°-20°
11.	Hip Medial Rotation	0°40°	0°-35°
12.	Hip Lateral Rotation	0°40°	0°-40°

Anthropometric examination

Table 2: Anthropometric measurement, length of lower extremity during initial examination

S.No.	Circumference of	Right (cm)	Left (cm)
1.	Proximal Thigh Girth 1cm below Gluteal fold	3 5	46
2.	Mid Thigh Between Inguinal Crease & Proximal Border of patella	35	39.5
3.	Distal Thigh Just proximal to femoral epicondyle	33.5	33
4.	Knee Girth-5cm above patella	34.5	31.5
5.	Knee Girth-5cm below patella	30	31.5
6.	Calf girth	25.5	31
7.	Ankle Girth Minimum Circumference proximal to medial malleoli	20	19.5

Strength test of lower extremity

Table 3

S. No.		Right side	Left side
1.	Ankle Dorsiflexors	1	1
2.	Ankle Planter flexors	1	1+
3.	Invertors	1	1
4.	Evertors	1	1
5.	Knee Flexors	1+	1+
6.	Knee Extensors	1	1
7.	Hip Flexors	1	1
8.	Hip Extensors	1	1
9.	Hip Adductors	1	2-
10.	Hip Abductors	1	1
11.	Hip Medial Rotators	1	1
12.	Hip Lateral Rotators	1	1

Neurological Examinations: Romberg's Test – Negative (Only done as orientational) Subjective Light Touch – Normal sensation Deep tendon reflexes: Patellar Reflex – 1 Ankle Reflex – 1 Plantar Reflex – 1

3. Conclusion of examination

The initial kinesiological examination shows the patient has both muscular and structural restrictions. Tightness of muscles surrounding the knee joint, mainly rectus femoris, biceps femoris, semimembranosus and tendinosus was shown by muscle length test. The structural restrictions around the knee joint, mainly restriction of patellar movement, was shown by joint play examination as well as postural examination that showed valgosity of knee joint on both sides. Muscle strength test shows loss of strength of muscles around knee and ankle joint, main muscles being quadriceps muscles for knee and for ankle peroneus longus and brevis. Gait examination and scale test indicates the same. ROM examination shows he has fixed Plantar flexion Deformity at 50°.

Short and long term Rehabilitation Short-term rehabilitation plan:

Short term plan was to stretch shortened muscles and gain muscle strength and ROM in knee and hip joint as well as remove the blockage on patella.

Long-term rehabilitation plan: Long term plan was to maintain strength and stability in knee joint.

4. Therapy Process

Patient Complained about some pain in his knee joint and inability to bend right knee beyond 15°. Joint play examination revealed restricted movement of right LE patella to all directions. Paraffin wax Bath treatment was given to the patient in order to make the muscles more pliable and increase joint mobility. Sustained Knee Flexion was maintained by placing pillow of different sizes and towel rolls under right knee, half kg- 2kg weight cuff was applied at right ankle to promote knee flexion. Patellar mobilization was done in cranial, caudal, medial and lateral direction. CPM –Continuous Passive Motion Machine was also used to maintain the knee ROM achieved during the course of treatment. Quadriceps Isometrics was also promoted to increase and maintain the strength in Post-polio limb. Prone Knee Bending was done by placing towel rolls below the flexed leg, to maintain the knee flexion, and the patient was promoted to isometrically contract his quadriceps in order to straighten the knee. Squatting with support and placing wooden board under the short leg to promote weight bear and hence more loading of the joint and bone, promoting more calcium & mineral deposition in the healed but weak bone. Training on wobble board - rocking side to side, up and down.

Keeping the posture same at all times. Balance and stability training of knee joint was done.

Final Kinesiological Examination Conclusion: Daily Knee ROM was measured Prior and post treatment. The final kinesiological was performed on 29 June 2015 and showed the patient's improvement to the therapy applied. The patient came for physiotherapy for lack of muscular strength and limited mobility in the affected area. The final examination shows patients improvement in muscular strength, mobility and muscle shortness after 8 week of therapy. There was better mobility of right Knee & minute increase in strength of quadriceps femoris on the right leg. There was still some shortness of biceps femoris, semi membranosus and semitendinosus on right side, as well has hip adductors of right leg. There was huge improvement in ROM of both hip and knee joint of right leg. Most noticeable being flexion of right knee to 110°. Even though he has improved, he has still not reached full mobility in knee joint. Strengthening part of the treatment was done by isometric contraction only, as the patient had atrophied muscles due to Polio. All in all I believe that the therapy was successful towards the goal that we set, but only having 3 weeks of therapy sessions was not enough to reach certain goals like reaching full mobility of Knee. With further therapy I think that is possible.

5. Conclusion

During the 3 weeks of Physiotherapy sessions, we had with the patient, we both could see the improvement from day 1 until our last session together. He improved greatly during the course of 3 weeks. The rapid improvement came after functional training with balance board and Sustained Stretching of Quadriceps Femoris with the pillow underneath. None the less, having only 3 weeks therapy session was not enough time to reach our goals for the long term rehabilitation. But with more functional training we believe that he will reach his goals.

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