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Case Report

Treatment of acute avulsion of posterior cruciate ligament of left knee with bony fragment by *Siddha Varmam* therapy and traditional bone setting method

S. Natarajan [a, *], C. Anbarasi [a], R. Meena [a], S.D. Muralidass [b], P. Sathiyarajeswaran [b], K. Gopakumar [c], R.S. Ramaswamy [d]

[a] *Varmam, Thokkanam and Traditional Bone Setting Division, Department of Clinical Research, Siddha Central Research Institute, Chennai, India*
[b] *Siddha Central Research Institute, Chennai, India*
[c] *Santhigiri Siddha Hospital, Pattom, Kerala, India*
[d] *Central Council for Research in Siddha, India*

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ABSTRACT

A 42-year-old man with the complaints of left knee swelling, severe pain, difficult to stand was reported to Siddha Varmam division after a road accident. He was diagnosed as acute avulsion of Posterior cruciate ligament (PCL). It was diagnosed based on the history of trauma, knee pain and swelling after trauma, positive posterior drawer test and avulsion fracture shown by radiograph. He was treated with Siddha Varmam therapy and traditional bone setting. After a month of treatment, the PCL avulsion fracture got healed without any surgical interventions and patient able to walk normally. This case report summarises the novel Siddha Varmam therapy and traditional bone setting treatments for acute avulsion of PCL with bony fragment.

1. Introduction

The Posterior Cruciate Ligament (PCL) is an important structure that helps to maintain the stability of the knee during flexion and rotation. PCL injuries may lead to instability that allows the tibia to move in the posterior direction, impeding the ability to keep the back of the knee joint straight and inducing degenerative changes in the knee in the long term. PCL injuries are less common than anterior cruciate ligament (ACL) injuries. Since the PCL is strong, avulsion fractures of its attachment are common [1]. A direct force of hit to proximal anterior tibia is defined as dashboard injury. The incidence of ligament damage is 95% in all knee injuries. Grade I and II PCL injury can be managed by non-operative procedures [2]. Standard treatment for the avulsed post cruciate ligament is surgical reinsertion [3]. Due to backward force on front of flexed knee, the PCL gets ruptured. A fragment of bone may be detached with PCL. Bony fragment may be detached from back of inter condylar region of tibia. The most common surgical procedure for PCL avulsion fractures is internal fixation. But it is tough to handle via arthroscopic procedure [4]. Traditional bone setting practises is gaining popularity currently in the urban cities for treating traumatic injuries [5]. *Siddha Varmam* therapy (SVT) specifies the therapeutic manipulation of certain points in which the life energy is found concerted. Handling on these points with a particular force for the definite time will release the life energy from these points and fetch relief to the affected individual by regulating the flow of life energy which is blocked due to attack on particular *Varmam* points or due to other causes [6]. The fear for surgical procedure for PCL avulsion fracture is the main reason for the patient to seek traditional medical systems.

2. Patient information

A 42-year-old man, electrical engineer had a trauma to his left knee while driving two-wheeler. When he applied sudden break, he was hit over the bumper on the left knee in the flexed position and fell down. His left leg was pulled down and experienced immediate pain and swelling around left knee. He had difficulty to stand on left leg. Soon he was taken to outpatient department for traditional bone setting under *Siddha Varmam* division at Siddha Central Research Institute (SCRI), Arumbakkam, Chennai 600106.

* Corresponding author.
E-mail: drnatarajan78@gmail.com.
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3. Clinical findings

The patient was clinically examined and found profuse swelling in the left knee and severe tenderness over the posterior aspect of the left knee. There was restricted movement especially with range of movements (ROM) 30° flexion. The anterior drawer test, valgus and varus stress test were negative. Posterior drawer test was positive with grade III instability (approx. 12 mm of posterior translation). On examination based on *Siddha* principles, it was observed that *Vatha Naadi* was predominant.

4. Diagnostic assessment

Radiograph showed fracture of posterior intercondylar eminence and lateral tibial fragment. Magnetic resonance imaging of left knee revealed acute avulsion of posterior cruciate ligament along with bony fragment measuring 12.2 × 7.2 mm and moderate joint effusion with extension to tibiofemoral and patellofemoral joint space. The avulsion fracture was diagnosed based on the following criteria: a clear history of trauma; knee pain and swelling after injury; positive posterior drawer test; PCL avulsion fractures of the tibia shown by radiography and an intact PCL on MR imaging.

5. Therapeutic intervention

Intervention: Siddha Varmam Therapy (SVT) (Figs. 1a–d) and Traditional Bone setting (TBS).

Dosage: Once in 3 days (10 bandages totally).

5.1. Procedure

Position of Patient: Lying in supine.

Position of Physician: Standing on the left side of the examination table facing the patient's knee.

After careful examination, the patient was treated with *Siddha Varmam* therapy (Table 1) [7] initially to reduce the pain. Then the left femur was stabilised by grasping the thigh approximately five inches above the knee by one hand. The other hand grasped the lower leg approximately four inches below the knee. Then the both hands were compressed towards each other. With the femur stabilized, the tibia was rotated laterally first, then medially. The rotation of tibia was maintained with pressure and compression down. Then the rotation was released slowly to its normal position [8].

Then the medicated oil, *Sivappu kukkil thailam* [9] was applied over the affected knee. Gentle massage was given. Then cotton gauze was wrapped around the knee and again oil was poured over it. Then 15 cm width cotton roller bandage was wrapped around the affected knee by traditional method of crossing the bandage at lateral and medial aspect of knee. This assured the tightness of the bandage. SVT was performed on the day of replacing the bandage once in three days. The procedures were repeated 10 times.

6. Follow up and outcomes

After Traditional bone setting (TBS) and bandaging, patient was asked to bear body weight on toes. Numeric Pain Rating Scale (NPRS) [10] was 9 initially. Soon after 3 days of 1st bandage, swelling was reduced. The NPRS reduced to 6. Then after 2nd bandage NPRS reduced to 4 and subsequently pain subsided. After 4 weeks flexion

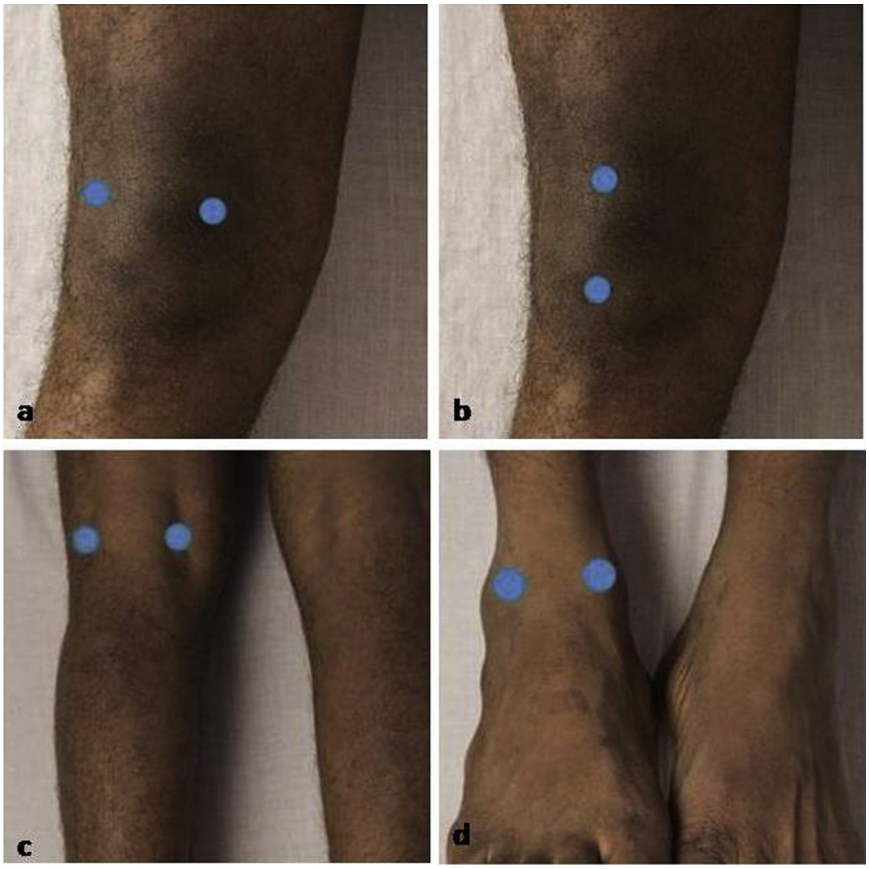


Fig. 1. Locations of Siddha Varmam Therapy. a. Location of *Muttukannu Varmam* in anterior aspect of left knee. b. Location of *Muttu siratai Varmam* in anterior aspect of left knee. c. Location of *Muttu pathaippu Varmam* in posterior aspect of left knee. d. location of *Karandaikannu Varmam* in anterior aspect of right ankle.

Table 1
Siddha Varmam Therapy - location of *Varmam* points and its procedure.

Name of the Varmam Points	Location	Patient position	Procedure	Duration and Pressure given
Muttukannu Varmam	Beneath the patella bone in small pits on either side	Lying supine with knee flexed position	Pressing the *Varmam* points with medial ¼ part of thumb and give rotations for 3 times. With an interval of 2 s again repeat it for 3 times.	30 Seconds and ½ *Mathirai*
Muttu Siratai Varmam	Upper end and lower end of patella	Supine position	Pressing the *Varmam* points with medial ¼ part of thumb and give rotations for 3 times. With an interval of 2 s again repeat it for 3 times.	30 Seconds and ½ *Mathirai*
Muttu pathaippu Varmam	Dimple on either side of centre of poplitaeal fossa	Supine with knee flexed position	Pressing the *Varmam* point with middle finger moving upward.	30 Seconds and ½ *Mathirai*
Karandaikannu Varmam	Anterior part of ankle on either side	Supine	Press and release the *Varmam* point using ¼ medial part of thumb.	30 Seconds and ½ Mathirai

and extension knee exercises were started. At the end of 2 months, full range of movements of left knee was achieved. The healing of fracture was assured by X ray after 2 months treatment (Fig. 2).

7. Discussion

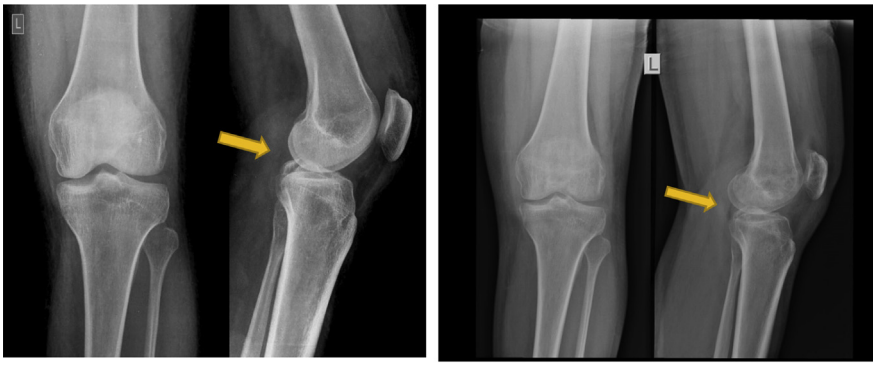
This case report describes an avulsion fracture of PCL along with bony fragment. This injury is different from other reported knee injuries to TBS OPD, as the patient is brought to the hospital soon after the fall. It is a case of acute avulsion of PCL along with the bony fragment. The fragment may be of tibial insertion of PCL. Due to avulsion, the fragment was detached. The nature of injury, swelling, capsular injury insists the significance of avulsion manoeuvre in detachment of bony fragment. This rare injury pattern may be due to nature of trauma.

The most common sites for PCL injuries are femoral and tibial areas. In this case the injury was at tibial insertion of PCL [11]. The injury to tibial insertion is rare. There are 3 possible causes for tibial insertion site PCL injury; hyperflexion of knee resulting in stuck of PCL between posterior tibial plateau and the roof of femoral ends in rupture [12], dashboard injury which occurs when a direct force is applied in pretibial area and therefore resulting in avulsion fracture [13] and hyperextension in proximal PCL injury [14]. In this case, the possible cause of injury could be dashboard type, based on the history and the presenting clinical symptoms. PCL has two bundles – anterolateral and posteromedial [15]. The width of these bundles differs in size. Moreover, the surface area where it gets inserted also varies. Osseous landmarks decide the shapes and position of this insertion sites. PCL is attached to posterior intercondylar fossa between tibial plateau and it also extends to below posterior part of tibial rim. This fossa is a trapezoid in shape and it widens inferiorly. The larger width of surface area and its components of PCL insertion is strong enough to avulse tibial condyle, when strong distraction force in applied on PCL.

Traditional bone setting has its own history in India. It is popular throughout India. TBS is an art of treating fractures and dislocations by the knowledge transformed from generation to generation. Cost effective treatment without invasive procedures, quick healing approaches along with traditional and cultural believes tend to attract the patient towards traditional bone setting. Fear of prolonged immobilisation with POP, sophisticated orthopaedic treatment, post-surgical complications and high cost makes the patient to seek traditional bone setting treatments. The relative merits of conservative and surgical managements of PCL injuries are controversial, surgery is said to be superior. Even though, the internal fixation is often made using steel wires, hollow lag screws and absorbable screws, the fixing of thin, small or commuted fragments is still lacking.

In Siddha Medicine, the term Varmam indicates the life energy which remains concentrated in certain specific points in our body. Varmam points are stimulated gently with the fingers. The pressure varies from ¼ unit, ½ unit, ¾ unit to 1 unit/2 units (unit = *Mathirai*). The changes occurring in the body on hitting some specific points directly or indirectly with a particular force is also known as Varmam. The signs and symptoms manifesting in the body varies with the location of the points, force of hitting, duration of pressure and the physical strength of the patient.

Varmam Therapy is the pressure manipulation over these points with a particular force for the specified time. This will regulate the flow of pranic energy which is obstructed due to assault on these points (Varmam points) or due to any other causes. In this case the Varmam treatment has been given to restore the strangulated life



Before treatment After treatment

Fig. 2. Acute avulsion of posterior cruciate ligament with bony fragment of left knee before treatment and after treatment.

energy due to trauma. TBS has been done to fix the fragment in position and facilitated by oil application. Moreover, the tight bandages over the knee sustains the position for healing. Frequent changing of bandages resembles functional casting model also helps in quick healing of fracture. With this case report we substantiate that the management through *Siddha* traditional bone setting treatment was effective in acute avulsion of PCL with bony fragment which was achieved by good knee function and assured by radiograph after treatment.

Informed consent

Written informed consent was obtained from the patient for publication.

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Conflict of interest

None.

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