

Management of High-grade Anterior Cruciate Ligament Tear: A Case Report on Integrating Physiotherapy and Ayurvedic Therapy

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ABSTRACT

Anterior Cruciate Ligament (ACL) tears are frequently managed surgically in conventional medicine; however, some patients seek alternative treatments due to personal preferences or contraindications. This case presents a 55-year-old male who suffered a high-grade complete ACL tear following a road traffic accident and fall. Despite recommendations for surgical intervention from multiple allopathic surgeons based on Magnetic Resonance Imaging (MRI) findings, the patient opted for an integrative approach combining *Ayurvedic* herbal and *Panchakarma* therapies with physiotherapy. The Ayurvedic treatment aimed to reduce inflammation, promote tissue regeneration, and enhance joint stability, utilising herbal medicines and therapeutic procedures such as *snehana* (oleation), *basti* (therapeutic enema), *alepa* (external application), and *upanaha swedana* (poultice). Concurrently, physiotherapy focused on strengthening the surrounding musculature, improving Range of Motion (ROM), and enhancing functional mobility. Over the treatment period, the patient experienced substantial pain relief, reduced knee swelling, and significant improvement in functional ability, enabling a return to daily activities without surgical intervention. This case underscores the efficacy and feasibility of an integrative approach in managing ACL tears, providing a holistic non surgical option for patients who are reluctant or unsuitable for conventional surgical interventions.

Keywords: Joint stability, Oleation, Physiotherapy, Therapeutic enema

CASE REPORT

A 55-year-old male patient came to the Outpatient Department (OPD) of *Kayachikitsa* with the chief complaint of chronic pain and swelling in his right knee joint, along with difficulty in walking, standing, sitting, and climbing stairs since seven months. The patient gave the history of road accident and fall in two feet deep trench seven months back. Patient told he stood up immediately after the fall and twisted his right knee. He immediately took the allopathic surgeon, consultancy and have been suggested MRI investigation. On investigation, MRI showed high-grade complete tear involving the proximal segment of the ACL, along with other abnormalities. The patient took advice of various surgeons, all of whom suggested that surgery was the only option. However, the patient was not willing to undergo surgery, so he approached Ayurvedic treatment and visited the OPD.

An examination of the patient was done [Table/Fig-1,2].

S. No.	Pariksha	Findings
1.	<i>Nadi</i> (pulse)	80/min (slightly elevated due to pain)
2.	<i>Mala</i> (stool)	Once in a day, regular, <i>Nirama</i> (no mucous)
3.	<i>Mutra</i> (urine)	5-6 times/day
4.	<i>Jivha</i> (tongue)	<i>Nirama</i> (not coated)
5.	<i>Shabda</i> (voice, speech)	<i>Spasta</i> (clear)
6.	<i>Sparsha</i> (skin/touch)	<i>Anushnasheeta</i> (normal)
7.	<i>Drika</i> (eyes)	<i>Prakrita</i> (No pallor/Icterus present)
8.	<i>Akriti</i> (physical appearance)	<i>Madhyam</i> (medium)

[Table/Fig-1]: *Ashtavidha pariksha* (eight fold examination).

Upon knee examination, swelling (grade III) and tenderness (grade III) around the knee were present, with limited ROM due to diffuse pain and injury. The Lachman test, anterior drawer test, and pivot shift test [1] were positive, indicating an ACL tear.

Investigation/radiological examination: Standard tests, such as Complete Blood Count (CBC) and blood sugar measurements, were within normal ranges.

S. No.	Pariksha	Findings
1.	<i>Prakriti</i> (Constitution)	<i>Vata-pitta</i>
2.	<i>Vikriti</i> (Pathological state)	<i>Vata-dosha</i> , <i>Asthi-Majja-dhatu</i> ACL tear, Swelling, and pain in the knee
3.	<i>Sara</i> (Excellence of tissues)	<i>Mamsa Sara</i> (Good muscle tone, but injured due to tear)
4.	<i>Samhanana</i> (Compactness)	Medium built, good muscle mass but currently impaired by injury
5.	<i>Pramana</i> (Measurement)	Height: 162 cm, Weight: 64 kg
6.	<i>Satmya</i> (Adaptability)	Adapted to a pure vegetarian diet, moderate exercise routine
7.	<i>Satva</i> (Mental strength)	Good, cooperative, motivated for recovery
8.	<i>Ahara Shakti</i> (Digestive power)	Good appetite, regular bowel movements
9.	<i>Vyayama Shakti</i> (Exercise capacity)	Limited due to injury, previously moderate activity level
10.	<i>Vaya</i> (Age)	<i>Madhyamavastha</i> (55 years)

[Table/Fig-2]: *Dashvidha pariksha* (ten-fold examination).

An X-ray showed no significant abnormalities. An MRI confirmed a high-grade complete tear involving proximal segment of ACL with retraction of torn end, associated with mild bulking of PCL. Mild anterior tibial translation for the distance of 6 mm was also observed, along with moderate soft-tissue oedema involving the proximal 2/3rd of the right leg. Additionally, there was mild to moderate joint effusion with periarticular soft-tissue oedema.

Diagnosis: The MRI confirmed the case of an ACL tear.

After completion of total of 21 days of treatment protocol [Table/Fig-3-5], patient achieved full ROM in the knee and was able to walk without pain or instability [Table/Fig-6,7] [2].

During both 1st and 2nd follow-ups, the patient was able to walk without pain and instability, with noticeable improvement in the movement of the knee joint. 1st follow-up of the patient was taken on 30 days after treatment, and last follow-up was taken 60 days after treatment.

Bahiya Chikitsa (External treatment)			
1.	Local Snehan, swedana	Murivienna oil	15 days
2.	Janu Basti	Murivienna oil	15 days
3.	Upanaha sweda	Kottamchukadi churna	21 days
Abhyantara Chikitsa (Internal medicine)			
1.	Lakshadi Guggul with mustamarmani kashay	500 mg with 30 mL kashay BD after meal	21 days
2.	Asthisamhruta (Hadjod) tablet	500 mg with milk BD	21 days
3.	Gandha Taila	10 mL with milk at bed time	21 days
Physiotherapy			
Open chain ROM (leg extension, ankle, hip exercise)			10 days
Leg press, lunges, static cycling, leg curl, strengthening exercises			10 days
[Table/Fig-3]: Treatment protocol.			



Criteria	Grade-0	Grade-I	Grade-II	Grade-III
Pain	No pain	Mild pain	Moderate pain	Severe pain
Tenderness	No tenderness	Mild-patient complains pain	Moderate- winces with pain	Severe-don't allow to touch
Swelling	No swelling	Mild swelling	Moderate swelling	Severe swelling
Limitation of flexion	No limitation of flexion (flexion $\geq 135^\circ$)	Mild limitation of flexion (flexion $< 135^\circ$ but $\geq 90^\circ$)	Moderate limitation of flexion (flexion $< 90^\circ$ but $\geq 45^\circ$)	Severe limitation of flexion (flexion $< 45^\circ$)
Crepitus	No crepitus	Mild crepitus	Moderate crepitus	Severe-even with slight joint movement
Joint instability	No instability	Mild instability (appreciable by patient but not elicited on clinically)	Moderate instability (elicited clinically)	-
Limitation of extension				
Full extension to 0° possible- Normal		Full extension to 0° not possible- Restricted		
[Table/Fig-6]: Assessment criteria [2].				

Assessment criteria	Before treatment	After treatment
Pain grade	III	0
Tenderness grade	III	0
Swelling grade	III	0
Flexion limit grade	III (40 degree)	I (130 degree)
Extension limit grade	Restricted	Normal
Joint stability grade	II	I
Crepitus grade	II	0
Lachman test	+	-
Anterior drawer test	+	-
Pivot shift test	+	-
[Table/Fig-7]: Outcome and follow-up.		

DISCUSSION

Ligaments, tendons, and corresponding muscles keep the knee joint stable. Between 25% and 50% of knee injuries are caused by

ACL damage [3]. It is believed that the main passive restriction on tibial anterior translation with respect to the femur is the ACL. The ACL, due to its specific position, enhances knee rotational stability in the frontal and transverse planes [4]. A pop is frequently heard, followed by pain; the knee becomes oedematous due to blood from the cruciate ligament haemorrhage and effusion, and knee pain develops. The diagnosis is confirmed by computed tomography, MRI, or X-rays [5]. Management of ACL injury mainly suggests ligament repair by invasive surgical procedures. In this case, the patient was not willing for surgery so he approached for Ayurveda treatment.

According to the signs and symptoms, an Ayurveda treatment protocol for *Snayugatavata* can be followed, as described under *vatavyadhi*. The first detailed description of *Sanyugata Vata* is provided by *Vāgbhata* and *Acharya Sushruta*. They establish a number of therapeutic procedures, including *Snehana* (oleation), *Upanaha* (poultice), *Agnikarma* (therapeutic heat), *Bandhana*, and *Unmardana* [6]. *Janubasti* (knee oil pooling) with *Murivenna* oil, followed by local oleation and steam, is adopted to give stability to the knee joint by its potential effects. *Murivenna* oil has shown its potential in promoting healing and tissue repair by alleviating pain, reducing inflammation, and improved joint mobility [7]. *Kottamchukadi churna Upanaha Sweda*, the application of a warm herbal poultice directly on the affected area, is a combination of herbs like *Musta*, *Eranda*, and *Rasna*, which are known for their anti-inflammatory, analgesic, rejuvenating properties, and promotion of tissue repair. These herbs penetrate the skin and exert therapeutic effects on the injured tissues [8].

Lakshadi Guggul is a traditional *Ayurvedic* formulation known for its potential benefits in treating joint disorders. This herbal compound is primarily composed of *Laksha* (*Purified Leadwort*), *Guggul* (*Commiphora mukul*), and other medicinal plants [9]. It is reputed for its anti-inflammatory and analgesic properties, which help alleviate pain and improve joint function. *Mustamarmani Kashay* is used as *Anupana* with *Lakshadi Guggul* and is believed to reduce inflammation, alleviate pain, and promote healing of the ligament. *Musta* (*Cyperus rotundus*) and *Marmani* (various *Ayurvedic* herbs used in joint and tissue health) are the key components known for their anti-inflammatory and analgesic properties [10]. The Tablet *Hadjod* possesses significant anti-inflammatory and analgesic effects. It is known to promote bone healing and regeneration, enhancing the recovery process of bone tissues, which can be beneficial for ligament repair and strengthening [11]. Ingredients in *Gandha taila*, ingredients like *Ashwagandha* (*Withania somnifera*) and *Bala* (*Sida cordifolia*), help reduce inflammation and alleviate pain and swelling associated with ACL tears. where as *Shatavari* (*Asparagus racemosus*) and *Laksha* (*Laccifer lacca*) promote bone health and support the repair and strengthening of ligaments [12]. Additionally, milk enhances the absorption of the active compounds in *Gandha taila* and provides essential nutrients like calcium and vitamin D, which are crucial for bone health and recovery [13].

Physiotherapy done for its potential benefits by focusing on reducing pain and swelling, maintaining ROM, and preventing muscle atrophy through open-chain exercises such as leg extensions, ankle pumps, and hip abduction/adduction. Transition to strengthening exercises, including closed-chain activities like leg press, lunges, static cycling, and leg curls. Incorporate quadriceps setting, hamstring curls, and hip bridges to improve muscle strength and joint stability [14,15].

The combination of *Ayurvedic* oral and external therapy with physiotherapy has provided significant improvement in this ACL injury. Similar cases showing the results and improvements observed in the patient's condition following the treatment [Table/ Fig-8] [7,16,17].

Author's name and year (Reference no.)	Case presentation	Treatment	Outcome
Suryawanshi DP and Pawar DA 2023 [7]	A 26-year-old male, complaining of pain and swelling in his left knee joint with occasional instability for the past two weeks	Ayurvedic treatment plan includes, <i>Nagaradi lepa</i> , <i>Janu basti</i> , <i>Bandhan</i> , <i>Pat rapotali sweda</i> , <i>Sastik shali lepa</i> and oral <i>ayurvedic</i> medication for 31 days	The patient was able to walk without instability and pain and attained improvement in range of movements of the knee.
Ruparel SJ et al., 2017 [16]	A 38-year-old female patient, housewife, suffering from knee joint ligament tear for five years	Ayurvedic treatment plan includes, <i>Janu basti</i> with <i>murivenna</i> oil and <i>shaman chikitsa</i> including <i>Rasa ausadhi</i>	Anabolic effect on muscle and ligaments and promotes early repair and strength in knee joint.
Tharesa AJ, Masalekar S 2022 [17]	A 22-year-old female with complaints of pain, occasional swelling and painful flexion of the right knee joint since two years	Treatment includes, external therapy- <i>Abhyanga</i> with <i>Murivenna</i> , <i>Visha Garbha Taila Pichu</i> , <i>Haridra Pottali Pinda Sweda</i> and internal <i>ayurvedic</i> medication for 21 days	Improves joint stability, reduces the symptoms of pain, swelling, stiffness and rehabilitates the individual towards his daily activities.
Present study, 2024	A 55-year-old-male patient complaining of chronic pain and swelling in his right knee joint with difficulty in walking, standing, sitting, and climbing stairs since seven months	Treatment plan included, local <i>snehan</i> , <i>Swedan</i> with <i>murivenna</i> oil, <i>Janubasti</i> , <i>Upanaha sweda</i> with <i>kottamchukadi</i> oil, oral <i>ayurvedic</i> medication and physiotherapy. Total duration of treatment was 21 days	Patient achieved noticeable improvement in grades of pain, tenderness, swelling and achieved complete strength of knee joint with full Range of Motion (ROM) and was able to perform daily activities of strenuous/non strenuous origin without pain or instability.

[Table/Fig-8]: Comparison of previously reported cases with present case [7,16,17].

CONCLUSION(S)

The inference from the case study on the integrated management of ACL tears is that a comprehensive approach, combining Ayurveda intervention and physical therapy, significantly improves functional recovery and long-term joint stability. Emphasising early diagnosis and tailored treatment plans, the study highlights the importance of a multidisciplinary *Ayurveda* approach in minimising complications and enhancing overall outcomes for ACL injury patients. Thus further research is needed to confirm these results with greater accuracy.

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