

## AYURVEDA APPROACH IN THE MANAGEMENT OF ANTERIOR CRUCIATE LIGAMENT TEAR OF KNEE

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## ABSTRACT

The knee is one of the largest and most complex joints in the body. The two cruciate ligaments in the knee, anterior and posterior, are often referred to as the 'crucial' ligaments, because of their importance in providing knee stability. Anterior cruciate ligament (ACL) injury is one of the most seen injury in sports and has a devastating influence on patients' activity levels and quality of life. Complete ACL rupture can induce other pathological knee conditions including knee instability, damage to menisci and the chondral surface, and osteoarthritis. Here a case report of a 28-year-old male who while playing football had a trauma to the right knee with a pop sound and acute pain at the time of incidence. He presented to the hospital with a knee which was swollen and tender. On MRI he was diagnosed with complete tear of ACL and grade II tear of lateral collateral ligament. A one-month Ayurveda treatment protocol was developed and followed for the patient. The patient was able to return to his daily activities without instability and also got relief from pain with noticeable improvement in the movement of knee joint.

**Keywords:** anterior cruciate ligament tear, knee joint, *janu sandhi*, *bhagna*

## INTRODUCTION

The knee is one of the primary weight bearing joints of the body. The price of its mobility is a tendency to instability.<sup>1</sup> It is also one of the most commonly injured joints as it is easily subjected to external forces, because of its anatomic structure and also due to the functional demands laid upon it.<sup>2</sup> The stability of knee joint is maintained by the ligaments, tendons and the associated muscles. Anterior cruciate ligament injuries account for between 25% to 50% of ligamentous knee injuries.<sup>3</sup> ACL injury poses unique clinical problems because of its poor capacity to undergo biological healing due to the local intra-articular conditions.<sup>4</sup> It is said that the anterior cruciate ligament rupture are “the beginning of the end of the knee”.<sup>2</sup> The common clinical findings after an ACL tear are restricted movements mainly extension, diffuse mild tenderness on knee. Usually the Lachman’s test is positive and also is very reliable in ACL rupture. The anterior drawer test may also be positive in most of the cases of ACL tear but literature says that its specificity is very less.<sup>5</sup> After a suspected ACL injury, an X-ray evaluation should always be done because radiographs may reveal an avulsion of the ligament from the tibia or a Segond fracture at the lateral margin of the tibial plateau.<sup>5</sup> MRI should be preferred in conditions where the diagnosis cannot be confirmed. The prognosis of ACL tear also depends on the fact that grossly there are two types of knee. First one which is the ACL dependent knee with poor secondary stabilizers. The second knee in which there will be well functioning secondary stabilizers and thus such a knee may not be completely dependent on the ACL. It is seen that a knee may have a satisfactory functional outcome even with a deficient anterior cruciate ligament for a long time. Any further trauma which may occur to knee later may predispose symptoms.<sup>2</sup> The decision whether the rupture should be managed conservatively or surgically depends a lot on the following factors- age, degree of instability, associated abnormalities, whether or not the patient intends to perform pivoting activities with the leg, occupation, social factors such as cost of treatment and the time, willing to undergo rehabilitation.<sup>5</sup>

ACL injuries usually occur in combination with other ligament or meniscal tears. The degree of the associated injuries also influences the outcome. The principles of rehabilitation process which is to be followed in conservative management are reduction of pain and swelling, restoration of full range of motion, increase of muscle strength and power, functional rehabilitation, and finally return to the activities. Conservative management of ACL tear is usually successful in persons who do not require movements such as pivoting and jumping. For assessing the success or failure of the treatment in ACL injuries, the three main outcome measures are ability to return to previous activity, re-injury rate, and prevalence of osteoarthritis.<sup>5</sup>

*Jānu sandhi* or the knee joint is a *sakthimarma* (*marma* present in lower limb) and also a *vaikalyakara marma* (an injury to a part which results in permanent disability to that joint).<sup>6</sup> *Jānu marma* is situated at the junction of *ūru* (thigh) and *jangha* (leg). *Ācārya Susruta* considers *jānu marma* as a *sandhi marma*. Its measurement is three anguli. Any injuries to this *marma* may lead to *balakshaya* (weakness) and *khanjatha* (lameness) which the subject has to suffer lifelong.<sup>6</sup> *Ācārya Susruta* has included the injuries to the *sandhi* under the umbrella term *sandhimukta* (injuries to joint) which is a type of *bhagna*. There are two types of *bhagna*. *Kanda bhagna* and *sandhimukta*.<sup>7</sup> The treatment told in *bhagna* may be adopted in knee injuries also.

## CASE REPORT

### • Presenting complaints

A 28-year-old male named ‘X’ previously healthy, complaining of pain and swelling in his right knee joint with occasional instability for the past 2 weeks.

### • History of presenting complaints

The patient reported of having sustained a twisting movement to his right knee while playing football. During the time of injury, he heard a popping sound from the knee and was unable to walk due to pain, and there swelling also developed within one hour. He consulted a physician and took rest for one week. The pain and swelling used to bother him whenever he stand or walk continuously for some time or when he gives much exertion to his knee. He was then advised to take an MRI

of right knee by the consulting physician and afterwards was advised to undergo surgery if the symptoms persist or worsens. The patient then consulted in the V.P.S.V Ayurveda college hospital for further management.

**• Investigations**

- X-ray- There was no radiologically detectable fractures

- MRI RIGHT KNEE - Complete rupture of Anterior Cruciate Ligament with partial rupture of Lateral Collateral Ligament.

**• On examination**

He had no other associated systemic illness. On detailed examination no associated neurological deficits were seen. The findings are given below.

**Table 1: INSPECTION**

Swelling	++
Contusion / bruising	Absent

**Table 2: PALPATION**

Warmth	++
Tenderness	Grade 1 – lateral compartment

**Table 3: RANGE OF MOVEMENTS**

Flexion	40-degree limitation in terminal flexion
Extension	20-degree limitation in terminal extension
VAS scale for pain on movements	3

**Table 4: TESTS**

Patellar tap test	Positive
Valgus test	Negative
Varus test	Negative
Anterior drawer sign	Positive (slightly)
Posterior drawer sign	Negative
Squat test	Negative
Lachman test	Positive

**TREATMENT PROTOCOL**

**Internal medications**

- *Musthadhi marma kasayam* – 60 ml – 6am (before food)
- *Punarnavadhi kasayam* – 60 ml – 6pm (before food)
- *Laksha guggulu tab* - 1 bid along with *kasaya*
- *Gandha thaila* – 15 drops bid (after food)
- *Guggulu tiktakam ghrtam* – 5ml bid (after food)

**Table 5: TREATMENT PROCEDURES**

Days	Treatment done	Condition of patient
Day 1 to 5	<i>Nāgaradhi lepa</i> (morning) and Bandage using <i>Murivenna</i> (night)	Swelling - reduced. Flexion -40-degree limitation Extension -20-degree limitation Tenderness -Grade 1 – lateral compartment

		Lachman test- +ve
Day 6 to 10	<i>Dhanyamla dhāra</i> and Bandage using <i>Murivenna</i> (night)	Flexion -40-degree limitation Extension -20-degree limitation Tenderness -Grade 1 – lateral compartment Lachman test- +ve
Day 11 to 17	<i>Taila dhāra- Murivenna</i> and Bandage using <i>Murivenna</i>	Flexion –complete Extension -complete with pain Lachman test- +ve
Day 18 to 24	<i>Patrapotali sweda</i>	Flexion –complete Extension-complete without pain Lachman test - +ve
Day 25 to 31	<i>Śaṣitika lepa</i>	Flexion –complete Extension -complete Lachman test - -ve Anterior drawer sign - -ve

**Table 6**

MEASUREMENTS (Girth in cm)	BEFORE		AFTER	
	RIGHT	LEFT	RIGHT	LEFT
10 cm proximal to tibial tuberosity	35	36	36	36
15 cm proximal to tibial tuberosity	39	41	40	41
20 cm proximal to tibial tuberosity	45	46	46	46

## DISCUSSION

Injuries those affect the knee joint may be correlated to *sandhimōksha* which is one among the two types of *bhagna* (fractures)<sup>7</sup> and thus *bhagna cikitsā* may be adopted in joint injuries. In all injuries initially an inflammatory mechanism will work in the tissue which is a protective action. Such an inflammatory mechanism if left uncontrolled without giving any management may result in a post-traumatic stiffness. Therefore, in order to get a better functional restoration the inflammatory mechanism should be allowed to remain in a very controlled manner.<sup>8</sup> The immediate management after an injury which is mentioned in *bhagna cikitsā* (fracture management) is *ālepa* (external application of a paste) and *bandhana* (bandage/immobilisation).<sup>9</sup> The *ālepa* may help to control the inflammatory reactions and thus reduce the swelling and pain to a certain extent. *Ālepa* may be applied till the gross swelling subsides (till the inflammation comes under control). Dur-

ing this period complete rest to the joint should be advised. In this case, patient was not in an acute stage but as there was some swelling, *ālepa* using *Nāgarādi lepa* was done for the first five days. Along with *ālepa*, *Murivenna bandhana* (bandage) was also done at night (12 hrs). *Bandhana* does the *ropaṇa* of *vraṇa* (injury which the ligament has sustained), gives *sandhi sthairyatha* (stability to the joint)<sup>10</sup> and also has a pressure effect on the injured area, thus controlling the occurrence of further swelling and pain to a certain extent. Along with the stability, the pharmacological effect of *Murivenna* used for *bandhana* also has a very important role. The acute anti-inflammatory effect of *Murivenna* has been proved clinically and experimentally.<sup>11</sup> On removal of *bandhana* after the required time, *pariṣeka/dhara* (pouring of warm medicine) may be given according to the condition. *Pariṣeka* may be done as a *sukōshṇa* (slight warm) local *dhara* (pouring) on the affected knee. *Pariṣeka* has *shramaghna* quality, thus it may rejuvenate the exhausted soft tissue in the joint. Since *pariṣeka* is done with warm liquids it may

also enhance the local circulation. The tissue metabolism may also get increased due to the pharmacological effect of the medicines used for the procedure. Thus an overall regeneration may be achieved by *pariṣeka*. As there was swelling in the knee joint, initially *pariṣeka* using *dhānyamla* was done. After the swelling was subsided *sneha pariṣeka* using *thaila* (oil) was done in view of increasing the muscle endurance / or the sustainability.<sup>12</sup> After *pariṣeka*, the mild swelling which persisted in the knee was subsided. During this treatment period static isometric knee exercises were advised to the patient. After the subsidence of swelling, *mrdu* (mild) *bāhya snehana* and *swedana* were given. According to the principles of Ayurveda, *snehana* helps in tissue regeneration. It may especially do the nourishment of *mamsa dhātu*. The *sneha* applied on the body for a period of 600 *mātra* will enter the *māmsa*, 700 *mātra* will reach *medas* and 800 *mātra* will reach *asthi* and *majja*. Since *snāyu* and *sandhi* are considered as the *upadhātu* of *medas*, a *sneha* applied for 700 *mātra* may reach the *sandhi* and nourish it.<sup>12</sup> *Snehana* and *swedana* may also increase the flexibility of the knee joint and thus reduce the stiffness of the joint.<sup>13</sup> An exercise pattern done in a phased manner along with *snehana* and *swedana* was also followed by the patient which helped to maintain the muscle endurance. After *snehana* and *swedana*, the knee regained complete movements, and the muscles were improved in their tonicity. After the joint was relieved from stiffness and regained the movements, then *brmhāṇa* line of management was undertaken. In any injury, after a time of immobilization and due to decreased activities, there will be disuse atrophy of the muscles which may be correlated as *mamsa dhātu kshaya*.<sup>14</sup> The treatment for *mamsa dhātu kshaya* usually done are *ṣaṣṭika sāli sweda*<sup>15</sup> and *mamsa pinda sweda*. These procedures strengthen the muscles in and around the knee joint (quadriceps, hamstrings, and gastrocnemius). In this case where *mamsa dhātu kshaya* was found, *ṣaṣṭika sāli lepa* was done for seven days. The instability was considerably reduced after *brmhāṇa* line of management. The quadriceps attained the normal tone and texture. Along with this procedure the patient was also advised to perform kinetic knee exercises. Thus, thirty one days

of treatment was done and the patient was able to walk without instability and pain and attained complete range of movements of the knee. There is a provision for watchful waiting when it comes to knee ligament and meniscal injuries. Usually the estimated non-surgical recovery timeframe for a ligament injury of knee depends on the extent of the original injury, pre-existing fitness and commitment to the rehabilitation. Complete rupture of anterior cruciate ligament with associated other ligament tears are difficult to manage conservatively unless the patient follow strict norms. In this case the patient 'X' was advised strictly to restrain from activities which involves twisting movements of the knee. The patient was allowed to do all other daily activities. Movements to the knee which requires twisting forces may further damage the ligament along with meniscal tears. In such cases surgery may be required as per the advice. The patient 'X' was followed up for one year and the period was uneventful.

## CONCLUSION

In Ayurveda there is an existing standard treatment protocol detailed in *Suśrutha Samhitha* regarding the management of injuries. A proper understanding of the injury through physical examination and supported by evidence based special investigations are necessary before planning of the treatment. By a collective protocol through Ayurveda treatment an overall outcome may be achieved in terms of signs and symptoms and of post traumatic complications. *Ācārya Suśrutha* explains that an initial conservative management should be tried in *śāstra sādhyā vyādhi* if the conditions permit and surgery is to be resorted when conservative management becomes inadequate.

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