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ANATOMICAL CONSIDERATION OF JANU MARMA WITHSPECIAL REFERENCE TO KNEE JOINT WITH ITS PATHOLOGICAL CONCEPT

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ABSTRACT

Janu marma is one of the *vaikalkara marma*. If injured it produces deformity or disability of the person. . After reviewing *Susruta's* description on *janu marma* its position, its measurement and its prognosis after injury ,it can be compared with the knee joint .The knee joint is largest synovial joint in the body it consist of three distinct and partially separated compartments that collectively form a complex hinge joint. These arrangements offer a fulcrum for the powerful extensor and flexor muscles that act on the joint during movement. Injury oriented deformity at knee joint can be avoided by certain preventive measures.

Key words- *Janu marma*, *Vaikalyakara marma*, Knee joint, injury.

INTRODUCTION:

Marma is an anatomical area where the five anatomical structures are collectively present. *Marma* point is concentrated point of prana (life). *Janu marma* present in the lower extremity, in the joining place of thigh and leg region. If it s get injured there will be limping. There are many anatomical structure related with *janu marma*, which can be compared with knee joint, injury of which due to pathological or any external factor leads permanent disability or loss of function.

JANU MARM:*Janu marma* situated in the lower extremity and forms junction of femur and tibia bone[1]. It is one of the *sandhi marma*, three *anguli pramana*.It is one of the *vaikalyakara marma* produce *Khanjata*) If it get injured it produces limping of the lower extremity[2]. The knee joint is vulnarable to the traumatic effect of these region produce pain and inflamation and loss of function. Blunt trauma produces permanent disability. Foreign body in bone produces many type of pain and inflammation, if foreign body present in the joint produces loss of function.[3]

The anatomical components of the knee joint are as follow[4.]as shown in fig-1

1. Articular capsule
2. The medial and lateral patellar retinacula
3. Oblique popliteal ligament
4. Arcuate popliteal ligament
5. Tibial collateral ligament
6. Fibular collateral ligament
7. Intracapsular ligaments (anterior cruciate ligament & posteror cruciate ligament)
8. Articular discs (menisci)
    a. Medial Meniscus.
    b. Lateral Meniscus
9. Patellar ligament
10. Prepatellar bursa, infrapatellar bursa and supra patellar bursa.
11. Common peroneal and tibial nerve.
12. Popliteal artery
13. Popliteal vein.

The knee joint is the largest and most complicated joint of the body joint of the body. It actually consists of three joints[5]

1. An intermediate patello femoral joint between the patella and the patellar surface of the femur
2. A lateral tibiofemoral joint between the lateral condyle of the femur, lateral meniscus and lateral condyle of the tibia
3. A medial tibiofemoral joint between the medial condyle of the femur lateral meniscus and medial condyle of tibia.

Following structures in reference to the contributing traumatic result.

a. Articular capsule
b. Ligaments
c. (I) Ligamentum patellae
d. (ii) oblique popliteal ligament
e. (iii) Medial meniscus
f. (iv)lateral meniscus
g. (v) Anterior &posterior cruciate ligament.
h. bursae

The joint between the femur and tibia is a synovial joint of the hinge variety, but some degree of ratatory movement is possible. The joint between the patella and femur is a synovial joint of the plane gliding variety[6].

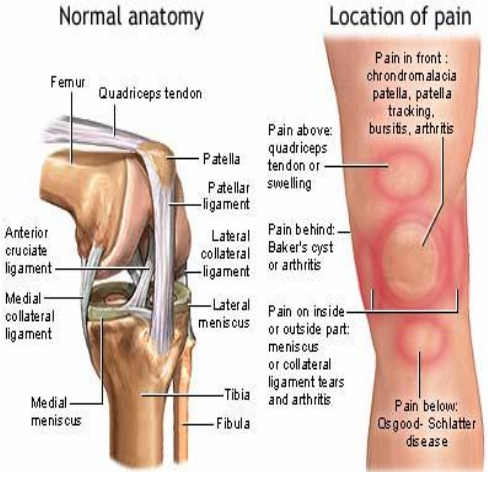

Fig- 1- Normal anatomy of knee joint.

The ligaments of knee joint are of three varieties, they are capsule, extra capsule, and intracapsule ligament. This capsule is involved in supra patellar bursa and oblique popliteal ligament. Extracapsule ligaments are ligamentum patellae, lateral collateral ligament, medial collateral ligament and oblique popliteal ligament. The intracapsular ligaments consist of two cruciate ligaments, which are very strong and cross each other with in the joint cavity. Anterior cruciate ligament is attached to the anterior inter condylar area of tibia and passes upward , backward and laterally to be attached to the posterior part of the medial surface of the lateral femoral codyle. Anterior cruciate ligament prevents posterior displacement of femur on the tibia. Posterior cruciate ligament prevents the tibia from being pulled posterior and anterior displacement of femur on the tibia[7]. (fig-2)

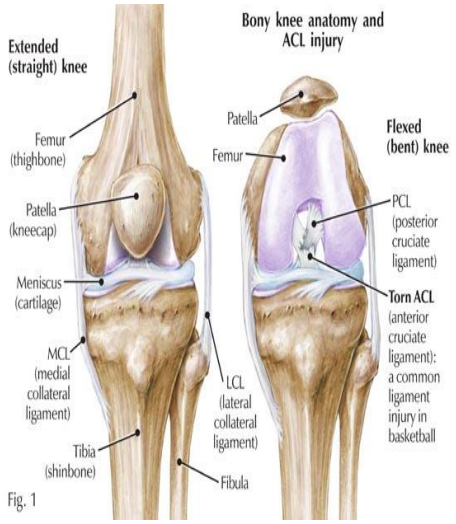

Fig-2 – Ligaments of Knee joint.

The menisci or semi lunar cartilages are c shaped lamellae of fibro cartilages which are triangular in cross section. The peripheral border is thick and convex and attached to the capsule, and the inner border is thin and concave and forms free edge. The upper surfaces are concave and are in contact with the femoral condyles. The lower surfaces are flat and in contact with the tibial condyles[8] .

Commonly Knee injuries are divided as follows:

Bone injuries and joint injuries. The janu marma deals more precisely with knee joint hence it will be come under joint injury. To understand the aspects of injury it is necessary to understand the anatomical aspect.

Joint surface are held in contact by the shape of the articulating surfaces, by the ligaments, by the surrounding muscles, and by atmospheric pressure. The importance of each of these factors varies with different joint. The joint of the knee depend for their stability mainly on the ligament. The purpose of the ligament is to prevent abnormal movement of

the joint. For these it may rely upon the supporting muscles, which contract reflexly to protect the ligament when it comes under stress. Muscles better protect some ligaments than other. For example the ligaments of the shoulder, the wrist and hip are well protected by muscles, where as collateral ligament of the finger joints and of the knee and inferior tibia fibular ligaments which is not well guarded by muscles, is intrinsically stronger than one that is well protected.

There are **13 bursae** around knee assisting in easy movement of the joint. These bursae are potential source of pain and disability when they become inflamed. Bursitis occur in response to direct trauma. Any of the multiple bursae of knee can be affected. A direct blow over the patellar ligament causes bursitis. In the lateral and medial bursae inflammation can result in deposition of calcific materials. Injury of bursa of fibular collateral ligament causes thickening of bursa wall and effusion with local irritation, which may be severe enough to cause pressure on peroneal, leading to peroneal palsy. Calcification of the bursae is common after injury, leading to stiffness affecting its mobility.

Synovial membrane lines the capsule and it is attach to the margins of the articular surfaces on the front and above the joint. It forms the pouch which extends up beneath the quadriceps femoris muscle for three fingerbreadths above the patella, forming the suprapatelar bursa. Injuries of the synovial membrane is extensive and if the articular surfaces, menisci, or ligaments of the joint are damaged, the large synovial cavity become distended with fluid . The swelling of the knee extends three or four fingerbreadth above the patella and laterally medially beneath the aponeuroses of insertion of the vastus lateralis and medialis respectively[9].

Injuries on the basis of severity can be enlisted as dislocation, subluxation, sprain and contusion.

1) Dislocation cannot occur without some damages to the protecive ligaments and joint capsule usually the capsule, and one or more the reinforcing ligaments are torn, permitting the particular end of the bone to escape through the rent. Sometimes the capsule is not torn, but its substance is stripped from one of its bony attachment. Sometimes the joint surfaces may be completely dislocated and yet both remain within the capsule. In joints the stability mainly depends on the muscles off their guard.

Dislocation of knee joint: The joint is dislocated or luxated when its articular surfaces are wholly displaced one from the other, so that all oppositions between that are lost.

Subluxation of knee joint: A joint is subluxated when its articular surfaces are partly displaced but retain some contact one with the other.

Dislocation or subluxation of a joint may be congenital, traumatic and pathological. But here we are concern with traumatic dislocation. The commonest traumatic dislocation of knee joint is Anterior dislocation, in which tibia slips forward and there may be complete rupture of medial lateral cruciate ligaments, displacement of semilunar cartilages with torn capsule.

2) Sprain is an incomplete rupture of ligament. It may be acute or chronic. An acute sprain is caused by sudden injury and there is macroscopic damage to the ligament. A chronic sprain is caused by long continued stress and microscopic structure changes in the ligament.

3) Contusion of a joint may involve capsule, synovial membrane and occasionally the articular cartilage. The injury sets up a local inflammatory reaction with swelling and serous exudates. It is due to an infiltration or extravasations' of blood in the tissue, following rupture of vessels, as a result blunt force, e.g. stick, stone, kick, or fist. Usually, there is no loss of continuity of the skin. Depending upon its location.

Janu marma injury can be correlated to various knee joint injuries: which can be classified as under [10]

1. Lateral strain – Medial or lateral ligament injury
2. Rotation strain – Semi lunar cartilage injury

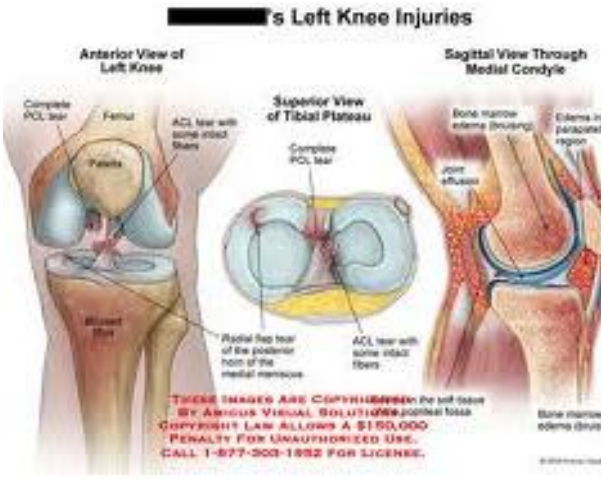

Fig-3- knee injuries.

3. Hyper extension strain – Anterior cruciate ligament injury, Posterior cruciate ligament injury Avulsion of tibial spine.
4. Direct violence – Bruise, injury to articular cartilages and bone, injury to bursa, injury to vessels and nerves, injury to muscles and ligament.
5. Chronic knee strain

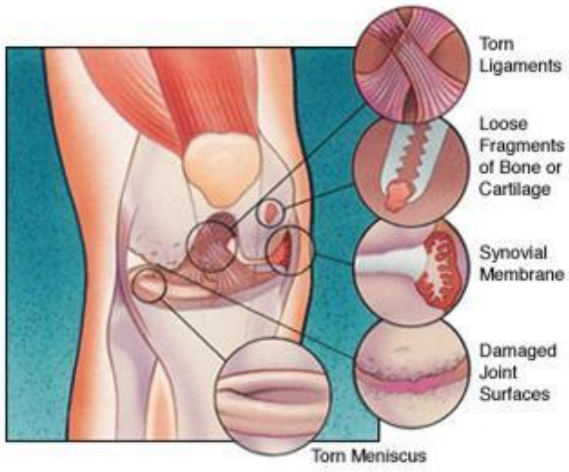

Fig-4-Injuries of the knee joint.

Janu Marma injury with special reference to types of knee joint injury involving various structures of knee joint and their effect

No.	Knee structure injury	Symptoms/Effects
1.	Ligament injury i)Anterior cruciate ligament injury ii) injury to medial ligament of right knee lateral ligament of left knee	Guarded walk,knee gives way medialy Distension of knee with blood,pain Laxity, lateral instability of knee joint
2.	Bursa injury	Lateral instability , intense pain, later stiffness
3.	Avulsion fracture of tibia	Abnormal movement of knee
4.	Meniscus injury	Defective joint movement
5.	Patellar injury	Severe pain, permanent restricted movement
6.	Articular surface	Dislocation of knee
7.	All structures including joint capsule, ligaments, synovial membrane, patellar fat pad, bursa, articular cartilage, bone	Truamatic synovitis- severe pain inflammation, effusion

The above injuries of knee joint causes muscle wasting, flaccidity, & reflex inhibition of quadriceps leading to deranged movement to complete loss of movement of joint . The above all symptomlogy and consequences of knee injury leads to *Khanjata (Janu marmabhigata lakshanas) according to Sushruta.*

Strength of the knee joint:

The strength of the knee joint depends the strength of the ligaments that bind the femur to the tibia and on the tone of the muscles acting on the joint. The most important muscle group is quadriceps femoris, provided that this is well developed, it is capable of stabilizing the knee in the presence of torn ligaments. Any activity which causes hurting the knee.

Ways to strengthen the knee joint[11]

- Oleation of the joint ,regularly
- Lose wt, 4-5kg,
- Take care while running jumping, landing from the height , during this activity Anterior cruciate ligament, menisci are get injured and torned
- Do exercise like stretching of Ilieo-tibial band, squatting for strong gluteal,
- Do step up for strengthing the hamstring muscles
- Do jumping – jumping help to strength the knees.
- Practicing the yoga, swimming, walking strengthen the knee joint
- Always wear proper running shoe.

Nutritious food for knee joint:

- Fish, flaxseed, olive oil ,whole fruit and vegetables
- Vitamin-e – spinach , peanut, broccoli, mango
- Calcium - milk, milk products, almonds, leafy green vegetables.

Conclusion:

As knee joint is largest and most complicated joint in the body. The complexity results in the fusion of three joints in one. It is a type of synovial joint, incorporating two condylar joints between femur and tibia, and one saddle joint between the femur and the patella. The articular surfaces are condyles of femur tibia and patella. It is supported by 11 ligaments and 13 burase. The stability of the joint is maintained by above said anatomical structure. Inspite of that, structurally it is weak joint due its arrangements of the joint surfaces. So, various deformity, diseases, and injuries can occur at knee joint which leads to disability that is why Acharyas have been mentioned janu marma as "*vaikalya Kara marma".* In day today stressful life knee joint undergoes wear and tear injury leading to hampered knee joint function. Though prognosis wise least importance has given to this joint, proper attention should be given to strengthens the joint by above said various measures to avoid or prevent deformities.

REFERENCES:

1. Prof. D. G. Thatte, Susruta Samhita - Shareersthana 6/24, published by Choukhamba Publishers, second edition 2005.
2. Prof. D. G. Thatte, Susruta Samhita- Shareersthana 6/12-13 published by Choukhamba Publishers, second edition 2005.
3. Kaviraj Ambikadatta Shastri, Sushruta Samhita, Ayurveda - tattva-sandipika, by Choukhamba Sanskrit samsthana, Varanasi 11th edition, 1997.
4. Watson Jones, Fracture and joint injuries page 1033.
5. Richard S. Snell, Clinical Anatomy published by Lippincott Williams & Wilkins, 7th edition, chapter-10, page no- 678
6. Prof. J.N. Mishra (2005) Marma and its management, Choukamba orientalia Varanasi 1st edition,chapter-4, page no- 94
7. B.D.Chaurasia, Human Anatomy. CBS publishers, 4th edition ch- 12, page no-143
8. B.D.Chaurasia, Human Anatomy. CBS publishers, 4th edition ch- 12, page no-145
9. Richard S. Snell, Clinical Anatomy published by Lippincott Williams & Wilkins, 7th edition, chapter-10, page no- 681
10.Prof. J.N. Mishra (2005) Marma and its management, Choukamba orientalia Varanasi 1st edition,chapter-4, page no- 95
11.http://health.usnews.com/health/news/blogs /eat-run/2012/11/05/top-5foods-to fight inflammation

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