AN OBSERVATIONAL CROSS-SECTIONAL STUDY TO EXPLORE THE VAIKALYAKARA EFFECT OF JANU MARMA THROUGH ANATOMICAL CONSIDERATIONS OF KNEE JOINT INJURIES RELATED TO SPORTS

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ABSTRACT

Introduction: The aim of the study was to determine the time to and rate of the return to sports (RTS) after knee joint injury. The data obtained was analysed to fine line the commonly affected anatomical entity responsible and to correlate with Janumarma. Methodology: The symptoms assessed from the case proforma and MRI were compared to the Janu Marmabhigathathathathathathathla Lakshanas. The grading of injury and Khanjatha was determined with the help of unique scoring adapted for the study. Results: Based on literary review Khanjatha can be defined as a weakness in limbs resisting its complete functional mobility. Anterior Cruciate Ligament (ACL) was found to be the most vulnerable structure. Cadaveric dissection studies showed the morphological significance of ACL to be placed as a Kandara has been surmised. Conclusion: Khanjatha is concluded as the difficulty in regaining complete functional mobility, which was observed in 70% of ACL injuries highlighting the plausible correlation of ACL as Janumarma.

Keywords: Sports injury, Khanjatha, Janu marma
INTRODUCTION
The concept of *Marma Shareera* though discussed widely for its therapeutical implications, leaves us a wide arena of untapped resources as diagnostic and prognostic tools. Its multitude of venues which is highly resourceful even in emergency management and sports medicine is yet to be utilized in a broader perspective. Sports persons often face the challenge of reduced competence following injuries despite of ultra-modern medical assistance. Reconstructive and rehabilitation therapies followed in sports medicine is having relatively limited curative rates especially in knee joint injuries. Conclusively the rate of players returning to competitive sports post trauma is alarmingly low. In this context it is simply logical to apply the prognostic views of Acharya Susrutha about the Janumarma and its Abhigatha in the light of modern radiological imaging techniques. Based on these views, treatment protocol could be devised incorporating all the possibilities of Ayurvedic approach in Marmachikitsa to provide a better alternative for surgically reluctant patients in this evolving medical world.

**Aim of The Study**
1. To establish the true implication of Vaikalya (Khanjatha) explained by Acharya Susrutha in the context of Janumarmabhigatha
2. To identify the most vulnerable part of Janu sandhi which when injured results in Khanjatha and there by establish it as a plausible correlation for Janu marma.

**Methodology**
Study setting: Department of Rachana Shareera, Alvas Ayurveda College, Moodbidri
Study was planned in 4 phases

**Phase 1: Literary and conceptual study**
Included data compilations from Bruhatrayee, Laghuthrayee and other classical books including journals, presented papers, previous work done

**Phase 2: Detailed study of Janu Sandhi Shareera with the help of cadaveric dissection**
Dissection of Janu sandhi was carried out in cadavers to determine anatomical structures contributing to Janu Marma

**Phase 3: Study based on clinical observations**
Carried out in Diasman sports clinic Kondotty under the guidance of Dr. Arshad.

**Phase 4: Radiological study**
Based on MRI and supporting evidence from x-rays

**Sample size:** 30

**Inclusion criteria:** Patients diagnosed with injuries to knee related to sports., H/o trauma within a minimum duration of 6 months. Age group- 15 to 35 years.

**Exclusion criteria:** Patients suffering from arthritic disorders., Patients having any congenital joint anomalies.

**Assessment criteria:** Informed consent was obtained from patients. A detailed case format (*Rugna patrika*) was prepared to assess the precipitating complaints in knee joint injury cases and compared it to *Janumarmabhigatha lakshana* explained in classics. The injured structure and the grade of injury was determined on the basis of collected MRI reports and analysed. The severity of Khanjatha was determined with the help of a unique scoring adapted for the study based on which the data was collected through systematic follow up.

**Results**

**Literary Review**
Based on the considerations and deliberations of references compiled from Bruhatrayee the literary implications of Khanjatha can be generalised from a visible limping to any weakness interfering the joint’s return to its functional rigour.

Also, Vaghbata highlights the involvement of Kandara in development of Khanjatha.

**Cadaveric Dissection**
On careful examination of dissected specimens, it was observed that the appearance of ACL is morphologically meeting the criteria for the Ayurvedic classification of kandara i.e. Vrutha Snayu.

**Radiological Findings**
Majority of the cases shows involvement of ACL alone or with meniscus or adjoining ligaments.
Khanjatha was found to be absent for 3 patients, 14 patients showed mild Khanjatha and 13 showed moderate Khanjatha. No patients reported severe Khanjatha.

Graph 3 Comparison of Khanjatha Score with Radiological Findings

Among patients who were reported no Khanjatha, 10% were having grade 1 injury, 50% of patients who reported mild Khanjatha had grade 1 injury while the other 50% had grade 2 injury. Among patients who had moderate Khanjatha, 15.3% of them were having grade 2 injury, 84.6% were having grade 3 injury.

Table 1: Comparison of Khanjatha score with distribution based on injured structure

<table>
<thead>
<tr>
<th>Structure involved</th>
<th>Mild</th>
<th>Moderate</th>
<th>Absent</th>
<th>Total</th>
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<td>ACL</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>ACL, MCL</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Medial Meniscus</td>
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<td>3</td>
</tr>
<tr>
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<td>6</td>
<td>0</td>
<td>7</td>
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<tr>
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<td>1</td>
</tr>
<tr>
<td>ACL, MCL, Lateral Meniscus, LCL</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Graph 4: Comparison of Khanjatha score with distribution based on injured structure
DISCUSSION
In the light of literary analysis, we can specify the term Khanjatha to a weakness of the Janu sandhi to return to its full-fledged functions there by influencing their RTS. 83% of the cases shows involvement of ACL alone or with meniscus or adjoining ligaments. Altogether 25 patients show involvement of ACL ligament in which 40% involves only ACL and the rest shows involvement of meniscus & collateral ligaments. All the patients involving ACL injury shows mild or moderate Khanjatha. Also, there is reference regarding the involvement of Kandara in developing Khanjatha. This signifies the findings in cadaveric studies providing morphological evidence to assume that ACL could be classified as a Vrutha Sanyu/Kandara. The severity of the Khanjatha and the rate of RTS is invariably depending on the grade of injury, among which 84.3% of grade 3 injury showing moderate Khanjatha in grade 2 injury 65.3% and in grade 1 50% of cases were presenting Khanjatha a miniscule of 10% was showing absence of Khanjatha ,in injuries related to menisci .In the light of above told postulations we may contemplate that cruciate ligaments are the commonly injured structure & cases with ACL injury symptomatically resemble Janumarmabhigatha.

CONCLUSION
Among the sample size of 30 the injuries involving ACL showed a total of 40% mild and 43% moderate Khanjatha. None showed severe Khanjatha which means visible impairment affecting gait. This summarises the fact that even if the acute symptoms associated is relieved considerably due to timely intervention the person finds it difficult to return to competitive sports, which is exactly the prognosis mentioned by Susrutha in the definition of Vaikalyakara Marma. Hence, we may conclude that the anatomical structure involved in Janumarmabhigatha is ACL.

Clinical Relevance
Outcomes following anterior cruciate ligament (ACL) injury are considered poor even after timely intervention. The study provides us ample evidence to ascertain that Marmabhigatha Chikitsa protocol should be devised and followed in managing such conditions and educating the patients about the impending complications will be a positive approach.

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