

## ORIGINAL ARTICLE

### Different techniques in management of multiple ligament knee injury

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#### ABSTRACT:

**Background:** Multiple ligament injuries (MLIs) are rare but potentially disabling traumatic events that involve at least two of the 4 major ligaments of the knee. The present study compared above three techniques in management of multiple ligament knee injury. **Materials & Methods:** 60 patients diagnosed with multiple ligament knee injury of either gender was divided into groups of 20 each. In group I, one staged surgery, in group II, two staged surgery and in group III, only extraarticular (EA) ligaments were repaired or reconstructed. Parameters such as Lysholm score, international knee documentation committee, knee injury and osteoarthritis outcome score were recorded. **Results:** The mean pre- Lysholm score was 1.6, 1.2 and 1.4, follow up (months) was 34.2, 35.4 and 33.2, post- Lysholm score was 90.3, 85.2 and 83.1, pre-IKDC was 20 in each group and post- IKDC A was seen in 6, 5 and 4, B in 10, 12 and 11 and C in 4, 3 and 5 in group I, II and III respectively. The mean pain was 95.4, 97.2 and 93.5, activity of daily living was 91.2, 87.6 and 88.4, sports was 90.4, 85.2 and 79.6, knee symptoms was 90.1, 86.3 and 81.3 and quality of life was 89.5, 86.3 and 83.1 in group I, II and III respectively. The difference was significant ( $P < 0.05$ ). **Conclusion:** All methods of knee ligament injury resulted in better clinical and functional outcome.

**Key words:** Lysholm score, Knee ligament, Osteoarthritis

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#### INTRODUCTION

Multiple ligament injuries (MLIs) are rare but potentially disabling traumatic events that involve at least two of the 4 major ligaments of the knee (anterior cruciate ligament [ACL], posterior cruciate ligament [PCL], posteromedial corner [PMC] including the medial collateral ligament [MCL], and posterolateral corner [PLC] including the lateral collateral ligament [LCL]).<sup>1</sup> The degree of ligament, other soft-tissue, and neurovascular injury occurs across a spectrum in patients with a traumatic knee dislocation of the knee, and management of such complex injuries requires a systematic approach.<sup>2</sup>

The ligaments injured vary greatly from one patient to another due to discrepancy in the magnitude of trauma, direction of the violent forces and position of the affected limb at the time of injury. Additionally, each patient who suffers from multiple ligament injured knee has his own individual character, including socioeconomic state and general health condition, associated with the distinctive requirement of lower extremity function for daily activity.<sup>3</sup>

Multiple surgical protocols have been proposed for the treatment of knee injuries. In recent time, surgery of the major ligaments of the knee has evolved toward an anatomically oriented reconstruction.<sup>4</sup> However, with evolving surgical techniques, additional problems developed, including tunnel convergence, either on the lateral or medial side of the knee,

involving cruciate and collateral ligament reconstructions.<sup>5</sup> Surgical strategies could be divided into 3 major categories first in which all injured structures were repaired or reconstructed in a single stage of operation (the one-stage), second involved ligaments were repaired or reconstructed, respectively, in two stages of surgery (the staged) and in third only extraarticular (EA) ligaments were repaired or reconstructed (the EA).<sup>6</sup> The present study compared above three techniques in management of multiple ligament knee injury.

#### MATERIALS & METHODS

The present study comprised of 60 patients diagnosed with multiple ligament knee injury of either gender. All were made aware of the study and their written consent was sorted before starting the study.

Demographic profile of each patient was recorded. They were divided into groups of 20 each. In group I, one staged surgery, in group II, two staged surgery and in group III, only extraarticular (EA) ligaments were repaired or reconstructed. ACL, PCL, PMC, or PLC and posterior capsule were repaired or reconstructed in patients. Parameters such as Lysholm score, international knee documentation committee, knee injury and osteoarthritis outcome score were recorded. Data was studied using paired Student's t-test with level of significance significant below 0.05.

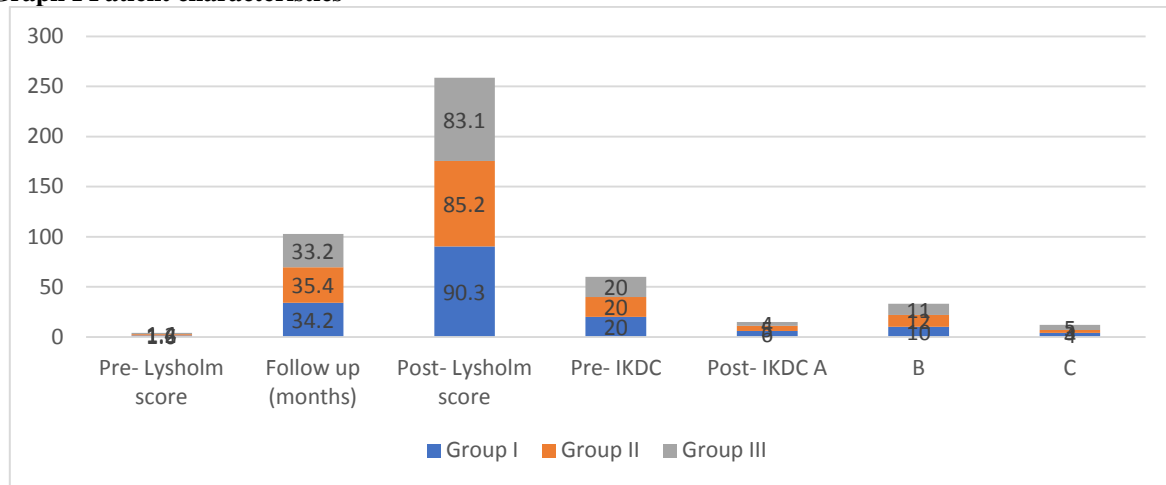
**RESULTS**

**Table I Patient characteristics**

Characteristics	Group I	Group II	Group III	P value
Pre- Lysholm score	1.6	1.2	1.4	0.92
Follow up (months)	34.2	35.4	33.2	0.81
Post- Lysholm score	90.3	85.2	83.1	0.67
Pre- IKDC	20	20	20	1
Post- IKDC A	6	5	4	0.09
B	10	12	11	
C	4	3	5	

Table I shows that mean pre- Lysholm score in group I, II and III was 1.6, 1.2 and 1.4, follow up (months) was 34.2, 35.4 and 33.2, post- Lysholm score was 90.3, 85.2 and 83.1, pre- IKDC was 20 in each group and post- IKDC A was seen in 6, 5 and 4, B in 10, 12 and 11 and C in 4, 3 and 5 respectively. The difference was non-significant (P> 0.05).

**Graph I Patient characteristics**

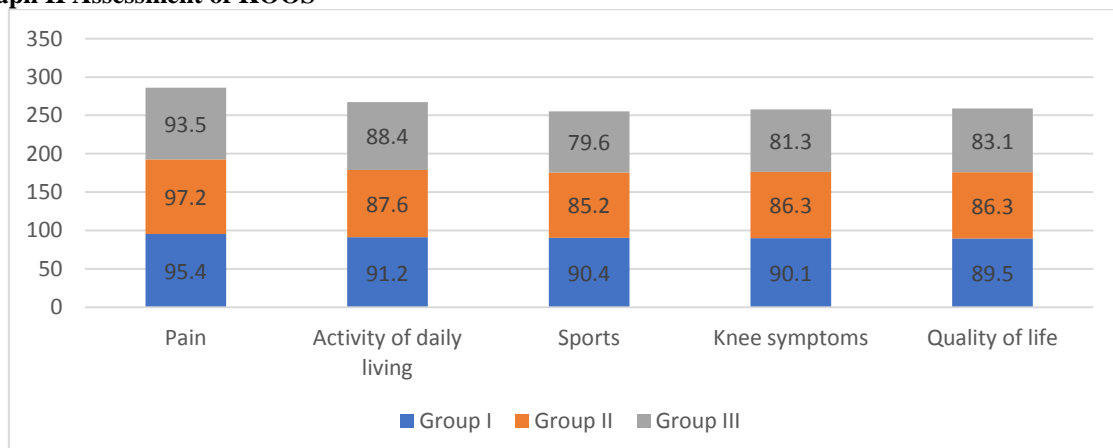


**Table II Assessment of KOOS**

Characteristics	Group I	Group II	Group III	P value
Pain	95.4	97.2	93.5	0.82
Activity of daily living	91.2	87.6	88.4	0.73
Sports	90.4	85.2	79.6	0.05
Knee symptoms	90.1	86.3	81.3	0.03
Quality of life	89.5	86.3	83.1	0.91

Table II, graph II shows that mean pain was 95.4, 97.2 and 93.5, activity of daily living was 91.2, 87.6 and 88.4, sports was 90.4, 85.2 and 79.6, knee symptoms was 90.1, 86.3 and 81.3 and quality of life was 89.5, 86.3 and 83.1 in group I, II and III respectively. The difference was significant (P< 0.05).

**Graph II Assessment of KOOS**



## DISCUSSION

The dislocated knee is a severe injury resulting from violent trauma. It results in disruption of at least 3 of the 4 major ligaments of the knee and leads to significant functional instability. Vascular and nerve damage, as well as associated fractures, may contribute to the challenge of caring for this injury.<sup>7</sup> Historical treatment was primarily limited to immobilization. However, with the advent of better surgical instrumentation and technique, the management of combined anterior and posterior cruciate ligament (ACL/PCL) tears associated with medial or lateral collateral ligament (MCL/LCL) disruption has become primarily surgical.<sup>8</sup> The degree of ligament, other soft-tissue, and neurovascular injury occurs across a spectrum in patients with a traumatic knee dislocation of the knee, and management of such complex injuries requires a systematic approach.<sup>9</sup> Although these injuries have been increasingly recognized over the past several years, there appears to be a lack of consensus among experts regarding how to treat multiple-ligament knee injuries. Repair and reconstruction of all injured ligaments in a single stage of operation are complex and time consuming.<sup>10</sup> The key points of the operative techniques include accurate location of the insertions of the reconstructed ligament, restoration of the normal femorotibial alignment, proper tension on the reconstructed ligament and reliable fixation of the grafts. Several authors recommended that ACL/PCL should be firstly tensioned at 70–90° of knee flexion under fluorographic monitoring for maintaining femorotibial alignment, followed by the tautness of EA ligament at 30° of knee flexion.<sup>11</sup> The present study compared three techniques in management of multiple ligament knee injury.

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In present study, mean pre- Lysholm score in group I, II and III was 1.6, 1.2 and 1.4, follow up (months) was 34.2, 35.4 and 33.2, post- Lysholm score was 90.3, 85.2 and 83.1, pre- IKDC was 20 in each group and post- IKDC A was seen in 6, 5 and 4, B in 10, 12 and 11 and C in 4, 3 and 5 respectively. We found that mean pain was 95.4, 97.2 and 93.5, activity of daily living was 91.2, 87.6 and 88.4, sports was 90.4, 85.2 and 79.6, knee symptoms was 90.1, 86.3 and 81.3 and quality of life was 89.5, 86.3 and 83.1 in group I, II and III respectively. When evaluating a dislocated knee, it is imperative to evaluate the

structural integrity of any remaining ligamentous structure; consequently, the functions of these structures must be well understood.<sup>13</sup> The ACL primarily prevents anterior translation of the tibia relative to the femur, and accounts for about 86% of the total resistance to anterior tibial translation.<sup>1</sup> It is also involved in limiting internal and external rotation of the tibia relative to the femur when the knee is in extension. The ACL will also limit varus and valgus stress in the face of either an LCL or an MCL injury.<sup>14</sup>

## CONCLUSION

Authors found that all methods of knee ligament injury resulted in better clinical and functional outcome.

## REFERENCES

1. Fanelli G.C. Surgical treatment of lateral posterolateral instability of the knee using biceps tendon procedures. *Sports Med Arthrosc.* 2006;14:37–43.
2. Stannard J.P., Brown S.L., Farris R.C., McGwin G., Jr., Volgas D.A. The posterolateral corner of the knee: repair versus reconstruction. *Am J Sports Med.* 2005;33:881–888.
3. LaPrade R.F., Johansen S., Wentorf F.A., Engebretsen L., Esterberg J.L., Tso A. An analysis of an anatomical posterolateral knee reconstruction: an in vitro biomechanical study and development of a surgical technique. *Am J Sports Med.* 2004;32:1405–1414.
4. Angelini F.J., Helito C.P., Tozi M.R. Combined reconstruction of the anterior cruciate ligament and posterolateral corner with a single femoral tunnel. *Arthrosc Tech.* 2013;2:e285–288.
5. Chuang TY, Ho WP, Hsieh PH, Yu SW, Chen YJ, Chen CH. One-stage posterior cruciate ligament inlay reconstruction combining anterior cruciate ligament reconstruction following knee dislocation. *Arthroscopy.* 2006;22:339.e1–7.
6. Lo YP, Hsu KY, Chen LH, Wang CJ, Yeh WL, Chan YS, et al. Simultaneous arthroscopic reconstruction of the anterior and posterior cruciate ligament using hamstring and quadriceps tendon autografts. *J Trauma.* 2009;66:780–8.
7. Fanelli GC, Edson CJ. Arthroscopically assisted combined anterior and posterior cruciate ligament reconstruction in the multiple ligament injured knee: 2- to 10-year followup. *Arthroscopy.* 2002;18:703–14.
8. Mariani PP, Margheritini F, Camillieri G. One-stage arthroscopically assisted anterior and posterior cruciate ligament reconstruction. *Arthroscopy.* 2001;17:700–7.
9. Zhao J, He Y, Wang J. Simultaneous arthroscopic reconstruction of the anterior and posterior cruciate ligaments with autogenous hamstring tendons. *Arthroscopy.* 2006;22:497–504.
10. Hayashi R, Kitamura N, Kondo E, Anaguchi Y, Tohyama H, Yasuda K. Simultaneous anterior and posterior cruciate ligament reconstruction in chronic knee instabilities: Surgical concepts and clinical outcome. *Knee Surg Sports Traumatol Arthrosc.* 2008;16:763–9.
11. LaPrade RF, Wozniczka JK, Stellmaker MP, Wijdicks CA. Analysis of the static function of the popliteus tendon and evaluation of an anatomic reconstruction: The “fifth ligament” of the knee. *Am J Sports Med.* 2010;38:543–9.

12. Fanelli GC, Edson CJ. Arthroscopically assisted combined anterior and posterior cruciate ligament reconstruction in the multiple ligament injured knee: 2- to 10-year followup. *Arthroscopy*. 2002;18:703–14..
13. Ibrahim SA, Ahmad FH, Salah M, Al Misfer AR, Ghaffer SA, Khirat S. Surgical management of traumatic knee dislocation. *Arthroscopy*. 2008;24:178–87.
14. Strobel MJ, Schulz MS, Petersen WJ, Eichhorn HJ. Combined anterior cruciate ligament, posterior cruciate ligament, and posterolateral corner reconstruction with autogenous hamstring grafts in chronic instabilities. *Arthroscopy*. 2006;22:182–92.