



RESEARCH ARTICLE

ACL – RECONSTRUCTIVE SURGERY WITH PROPRIOCEPTIVE EXERCISES – AN EVIDENCE BASED STUDY

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ABSTRACT

An increasing road traffic accidents among youngsters injury bones and ligaments among youngsters injury bones and ligaments needs prompt care. Post anterior Cruciate ligament reconstruction surgeries (ACL – R) with due physiotherapy and regular follow up are vital for good functional outcome.

Aims & Objective of this original case presentation was to analyse impact of core strengthening along with knee rehabilitation on obesity and womac scale post ACL – R.

Materials & Methodology: 32 year old female having undergone ACL – R (Left) was regularly treated with physiotherapy from 06.06.2017 till 10.12.2017. With core strengthening, closed kinematic exercises impact of exercises on obesity and knee functioning were evaluated and analysed using due statistical means.

Results: reduction in obesity and womac scale with $P < .01$.

Conclusion: Physiotherapy to the affected limb along with core strengthening resisted and closed kinematic exercises shows on early prognosis with functional activities and reduction in obesity were the major outcome of this presentation.

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INTRODUCTION

ACLR following injury to the AC ligaments is a common surgical procedures with 3,00,000 reconstructions performed each year (Cohen & Sekiya 2007) and since ACL is the primary stabilizer for anterior tibial displacement and the secondary stabilizer for tibial rotation, an ACL – deficient knee can often lead to devastating consequences such as articular cartilage injuries, meniscus tears functional instability and the potential for early onset of osteoarthritis (Beynon *et al.*, 2005). Education about post surgical exercises reasons for limited motion and crutch use, all will help stimulate early functional recovery of knee function and help the patient create a realistic image about the rehabilitation process in general (Manske *et al.*, 2012). One of the most common complications following ACLR is postoperative motion loss, with immediate goal for full knee terminal extension. As soon as possible, as loss of extension could results in abnormal, as loss of extension could results in abnormal joint arthro kinematics at both tibiofemoral and the patella femoral joints leading to abnormal cartilage contact pressures and inability to contract the quadriceps muscle due to fatigue and pain (Bennum 1982).

Aims & Objectives: of this original case study was to evaluate the efficacy of Proprioceptive exercises post ACL – R using womac scale

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MATERIALS AND METHODS

Mrs.XX, aged 32 years, qualified dentist had an accident with motor bike and injured ACL, subsequently arthroscopically reconstructed using graft at Chennai multispecialty hospital on 30.05.2017 was attending for further rehabilitation at the authors physiotherapy center from June 2017 till today. She was treated with daily physiotherapy sessions for the six weeks period from 06.06.2017 till 22.07.2017.

The following were the therapeutic means used on her

- She was ambulant with walker with non weight bearing on left lower extremity
- Resisted exercises were given to contralateral leg, both upper extremities
- Open kinematic chain exercises were used for strengthening of ACL – reconstruction (ACL – R) leg muscles in supine, side, prone and high sitting
- Range of motion of knee flexion of ACL – R was gradually increased with gravity using physioball and pillows
- Mild Proprioceptive exercises with CKC using physioball was added from 4th week in supine and high sitting positions
- Core strengthening exercises were added from 2nd week post ACL- R

- Specific emphasis on bilateral quadriceps muscle strengthening on all postures were done.

From 23.07.2017 till 10.12.2017 the following therapeutic means were added with weekly thrice frequency

- Partial weight bearing in prone position was added
- Later using walker progressed to single stick with gradual weight bearing exercises were added
- She was able to walk unaided from 8th week onwards
- Bilateral knee mobilization and strengthening were continued with weekly once frequency from

RESULTS

Table of results on pre and post, BMI and womac, post ACL – R, Score with Proprioceptive exercises on using student ‘t’ test

Parameter		Mean	SD	SE	t	p
BMI	Pre	28	2.89	1.67	2.99	<.01
	Post	23				
Womac	Pre	76	34	19.67	3	<.01
	Post	17				
Range of Motion of Knee (Left)	Pre	0-10				
	Post	0-110				

(Left) Motor Power of Pre 2/5
Quadriceps Femoris Post 4/5

DISCUSSION

- Neuromuscular strategies control the knee joint are highly varied (Bentley *et al.*, 2002) and likely to play a role in protecting the knee during unexpected perturbations (Patterson *et al.*, 2001). Hence rehabilitation treatments on improving dynamic stability of the knee joint during, functional tasks are most improvement (Wilk *et al.*, 2003)
- Weight bearing exercises are often including in a knee rehabilitation program as they are purported to minimize strain on the ACL (Ebben *et al.*, 2002). Procedure lower patellofemoral compressive forces compared to non weight bearing exercises (More *et al.*, 1993) and involve synergistic muscle activation consistent with functional activities like standing and stair climbing (Palmitier *et al.*, 1991). Weight bearing exercises, a necessary prerequisite to ambulation, improving this ability is also one of the foremost goals in the physical rehabilitation (Brunt *et al.*, 1995)
- Quadriceps muscle weakness was one of the main consequences after ACL reconstruction hence neuromuscular control exercises are most important (Iked *et al.*, 2002, Konishi *et al.*, 2002, Williams *et al.*, 2003). An improved quadriceps motor power was evidenced on the subject as shown in results table. If the patient has difficulty performing supine terminal knee extension, they can perform this exercise in the prone position with hip extensors aiding achievement of full extension (Weber & Woodall 2004)
- Also several EMG studies supported weight bearing exercises and joint force analysis (Beutler *et al.*, 2002) and also many non contact ACL injuries are attributed due to lack of neuromuscular control (Parkkari *et al.* 2001)
- Hewett *et al.*, 1999 support that recruiting and activating muscles in functional patterns may improve proprioception and coordination leading to decreased rates of injury. This was true from this study as with Proprioceptive exercises early rehabilitation was recorded.
- Liu ambrose *et al.* 2003 determine the effects of Proprioceptive training programs on neuromuscular function after ACL - C and found that Proprioceptive training can improve muscle strength and is beneficial for restoring functional ability. Closed kinematic chain position exercises where there is a decreased stress placed on the graft tissue as compressive forces at the tibio femoral joint and contraction of muscles surrounding the knee help control excessive motion at all joints in the closed chain (Ohkoshi *et al.*, 1991)
- Knee with early past operative usage to be resulting in fewer problems with swelling and less pain compared to rehabilitation without a brace, but long term follow up there does not appear to have a substantial effect on clinical outcomes such as range of motion, laxity or function as brace use is controversial, bracing was used more for relief of pain than stability (Harlainen *et al.*, 1997).
- Total leg strengthening is defined as exercise to joints proximal to distal to the joint in question are done to help decrease unwanted excessive frontal or transverse plane rotations that can occur due to either proximal or distal weakness. Lack of proximal trunk control can contribute to abnormal lower extremity alignment during functional exercises. Hence exercises for hip and foot can be done either in open or closed kinematic positions.
- ACL rehabilitation to their pre-morbid functional level is more important as muscular deficits are seen in 2 years post surgery and subsequent injury to either knee within 5 years following repair is 7% in those aged 18-25 (Shel Bourone *et al.* 2009).

Conclusion

Proprioceptive exercises were productive among post ACL – R on this subject as evidenced with other research reports. Hence these exercises which were similar to functional means and time conserving should be added in other rehabilitative programmes.

Limitations of this research: were short duration follow up, only subjective rating score was used to evaluate therapy outcome, but further studies using other modes of exercises, electrotherapy modalities for pain relief, inclusion of control groups are highly recommended.

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