

Case Report

HUBER 360 and PRIMUS-RS in the Advance Rehabilitation of a Patient with Right Anterior Cruciate Ligament Reconstruction

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ABSTRACT

Background: HUBER 360 and PRIMUS-RS are technologically advance rehabilitation and assessment equipments. However, there is a dearth of literature, to the best of our knowledge, on the use of the above equipment's in the objective assessment and effective rehabilitation.

Case Report: The case discussed is of a 30 year old female who underwent Anterior Cruciate Ligament (ACL) Reconstruction three months prior to approaching our physiotherapy department and was looking for more advance rehabilitation. A thorough pre-assessment was done, a part of which included the PRIMUS-RS testing of isometric strength, power and endurance of knee muscles. A week wise rehabilitation protocol was designed for 5 weeks on HUBER 360 at the end of which again PRIMUS-RS testing was done. It was then found that the deficits in the muscle strength, power and endurance had reduced and patient perceived herself to be able to perform better in her daily activities.

Conclusion: Thus, it proves that the PRIMUS-RS and HUBER 360 play an important role in objective assessment and rehabilitation of a musculoskeletal patient.

KEY WORDS: Anterior Cruciate Ligament Reconstruction, HUBER 360, PRIMUS-RS, Rehabilitation.

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Access this Article online	Journal Information
Quick Response code 	International Journal of Physiotherapy and Research ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr
	Article Information
	Received: 12 June 2022 Peer Review: 15 June 2022
	Accepted: 29 July 2022 Published (O): 11 August 2022 Published (P): 11 August 2022

DOI: 10.16965/ijpr.2022.134

INTRODUCTION

HUBER 360 is a neuromuscular training equipment having a platform with sensors that works for flexibility and mobility, resistance, dynamic posture, balance and coordination along with cognition. It is a fun, game like equipment which keeps the patient engaged while getting the exercises done. It also has a screen which helps in visual feedback and also displays the performance of the patient in the end of each segment. Each aspect has 5 levels with increasing challenge [1,2].

Similarly, PRIMUS RS is an advance objective assessment and rehabilitation equipment which measures isotonic, isometric and isokinetic muscle strength, power and endurance. It is known for its comprehensive analysis [3].

There is a dearth of literature, to the best of our knowledge, on the use of the above equipments in the objective assessment and effective post orthopedic surgery rehabilitation. Hence through the case study we wanted to highlight the successful use of the same in

the advance, long term rehabilitation of a patient with the Anterior Cruciate Ligament Reconstruction.

CASE REPORT

A thirty year old female came to the physiotherapy out patient department with the chief complaints of weakness in the right lower limb, three months post operative anterior cruciate ligament reconstruction. She had done her initial rehabilitation at some other physiotherapy centre and now come to our tertiary care hospital rehabilitation department in order to obtain further progress in her rehabilitation. She was able to do her activities of daily living but was experiencing some discomfort in the same and experienced some limping after brisk walking of 15- 20 steps. Patient was still apprehensive about being able to walk longer distances and said that she felt some kind of pain on the anterior joint line.

We took a detailed history and went through the surgical notes which mentioned anterior

cruciate ligament reconstruction with Semiten-dinosus and Gracilis grafting done. She had undergone strengthening exercises with one kilogram weight cuff of Quadriceps muscle (especially Vastus Medialis Obliques), Hamstring muscles, Gastrocnemius muscle. Initially she was taught closed chain exercises and later progressed to open chain exercises. We did a thorough assessment as mentioned in Table 1

After the thorough assessment which involved the subjective physical examination as well as the objective muscle strength examination, patient was taken on HUBER 360. The following treatment protocol was given to her as shown in Table 2. The patient was taken on HUBER 360, every alternate day for 1 hour for 5 weeks. After 5 weeks of intense rehabilitation the PRIMUS-RS testing was re-done which showed reduction in the deficits as compared to before as shown in Table 3.

Table 1: Assessments done prior to starting the rehabilitation

Assessment	Results		
Pain- Visual Analogue Scale	0/10 on normal paced activities		
	3/10 on fast paced and brisk walking/running		
Range of Motion	Terminal range of 10 degrees of knee extension was restricted probably due to reflex hamstring tightness owing to protective mechanism after ACL tear. Also the reconstructed ACL could be sutured back tight owing to terminal knee extension restriction.		
	Knee flexion was 10- 120 degrees and terminal range was restricted which caused stretch at the rectus femoris muscle		
Muscle Strength- Isometric	As assessed on PRIMUS- RS before rehabilitation		
Power	PRE REHAB	Deficit in Knee flexors (L minus R)	Deficit in knee extensors (L minus R)
Endurance	ISOMETRIC STRENGTH	5.1 lbs	15.9 lbs
	POWER	7 watts	19.3 watts
	ENDURANCE	278.1 Joules	185.2 Joules
Posture	Patient had the knee slightly flexed on the affected side and due to the same reason trunk tilted to the affected side as a compensatory mechanism.		
Gait	Heel Strike was reduced and there was lack of complete knee extension on the affected side		

Table 2: Week wise treatment protocol followed on HUBER-360.

Rehabilitation Time line	Exercise Program on HUBER 360
1 st week	Flexibility program for Calf, Hamstring, Quadriceps, Hip flexors and Quadratus Lumborum with increasing levels of progression as per the patients' tolerance
2 nd and 3 rd week	Along with the flexibility protocol addition of posture and balance training starting with easier levels and increasing the difficulty levels. Strengthening for Quadriceps, Hamstrings, Gluteus, Core, Gluteus Medius and Erector Spinae
4 th and 5 th week	Resistance and Endurance mode of exercises were added and continued for the entire lower limb kinematic chain with increasing level of challenge.

Table 3: Post assessment done after completing 5 weeks of rehabilitation on HUBER 360.

Assessment	Results		
Pain- Visual Analogue Scale	0/10 on normal paced activities and on fast paced and brisk walking/running		
Muscle Strength- Isometric	As assessed on PRIMUS- RS after rehabilitation		
Power	POST REHAB	Deficit in Knee flexors (L minus R)	Deficit in knee extensors (L minus R)
Endurance	ISOMETRIC STRENGTH	2.3 lbs	5.4 lbs
	POWER	1.8 watts	10.9 watts
	ENDURANCE	109.7 Joules	64.2 Joules

DISCUSSION

Our case report focuses on the fact that PRIMUS-RS and HUBER 360 can be objective and valuable tools in the long term rehabilitations of musculoskeletal patients. Previous literature shows that HUBER 360 has provided patients a way of working in safe conditions based on their physical and cognitive abilities, thus ensuring their neural and muscular rehabilitation in lumbar radiculopathy. [2] Moreover another study done on Multiple Sclerosis patients revealed that HUBER 360 helped in improving the overall gait of the patients. [4] Another study on low back pain patients showed HUBER 360 to be having good efficacy on proprioceptive system and quality of life. [5] Szlezak et al in his study used PRIMUS-RS to measure the knee proprioception using angular deviation from the center of the kinetic range in the knee joint and confirmed its efficacy in objective measurement.

CONCLUSION

In conclusion we can say that PRIMUS-RS and HUBER 360 are advance and accurate tools for rehabilitation in patients in the long term rehabilitation ensuring beneficial outcomes.

Conflicts of interest: The authors declare that they have no competing interests

Authors Contribution: RK compiled and made the first draft of the manuscript. ZR did the editing and compiled the final manuscript.

ACKNOWLEDGEMENTS

We would like to acknowledge the patient for her cooperation and for consenting to publications of her details.

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How to cite this article: Raveena Kini, Zoeb Rangwala, HUBER 360 and PRIMUS-RS in the Advance Rehabilitation of a Patient with Right Anterior Cruciate Ligament Reconstruction: A Case Report. *Int J Physiother Res* 2022;10(4):4322-4325. **DOI:** 10.16965/ijpr.2022.134