



# Effectiveness of Proprio kit as an adjunct to conventional Physiotherapy on soft tissue stretchability and pain threshold in postoperative knee joint stiffness patient – A pilot study.

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## ARTICLE INFO

## ABSTRACT

This study is aimed to develop a proprio kit for the postoperative knee joint stiffness patients, to improve the quality of rehabilitation phase. Two different groups were made of the postoperative knee joint stiffness patients. Ethical permission was taken and proper consent from the patients were taken, the patients were given detailed information about the study. The group A was given conventional treatment including all the rehabilitation steps without the proprio kit while group B was trained with the conventional methods as well as the proprio kit in addition and the results were compared of both the groups. Different outcome measures were used like range of motion assessment and pain assessment. Based on the results it was analyzed that the patients of group B were shown speedy recovery as compared to group A. The proprio kit enhances the rehabilitation by reducing the pain and improving range of motion in less duration.

**Keywords:** Proprio kit, rehabilitation, stiffness, postoperative.

## Introduction:

Knee joint stiffness is a limitation of range of motion. It is caused due to the flexion contracture or extension contracture or combine both contracture.[1] Knee joint stiffness if often combine with the constant pain.[2] The knee joint stiffness if caused mainly due to injury, infection and surgery on and around the knee joint. The loss of extension or loss of flexion or combine is caused mainly due to the knee stiffness.[3] Adhesions in the intercondylar notch or tibio-femoral compartments causes the limitation in knee extension. And adhesions in the suprapatellar pouch or the patellofemoral joint, and fibrosis or adhesion of the quadriceps muscles causes the limitation in flexion in knee joint.

There are many methods for the rehabilitation of the postoperative knee stiffness but not any one method is universally accepted. Physiotherapy is beneficial both before and after knee surgery, according to a sequential cohort research and a preliminary randomized clinical trial.[4] Whole body vibration is another particular rehabilitation method demonstrated by RCT and clinical trial. It is intended to help patients with low extremity weakness achieve postural control, enhance their counter movement, and strengthen their muscles. In continuous passive motion (CPM), an external motorized device passively pushes the knee joint through a predetermined intended arc of motion. This technique has also been studied in literature.

For the intact brain control of movement, proprioceptive impulses from mechanoreceptors of the joints, muscles, tendons, and skin are necessary. The modulation of muscle tone, postural reflexes, and the spatial and temporal elements of volitional movement are all substantially hampered by the absence of proprioceptive afferents. Proprioceptive and kinaesthetic dysfunction is linked to a number of neurological and orthopaedic diseases, including peripheral sensory neuropathies, focal dystonia, Parkinson's disease (PD), stroke, and injuries to the ligaments, joint capsules, and muscles. It has been suggested that proprioceptive sense training should be the primary focus of therapies trying to recover motor function following damage, given the

significance of proprioception for motor control. Many interventions present themselves as a type of proprioceptive training that enhances motor recovery and proprioception.[5] Pain may have a possible contributing component in the presence of a reduced proprioceptive process, even if the relevance of this condition is still uncertain.

A wearable gadget called Proprio-kit has tiny vibrating plates inside of it. It is divided into two sections: one for the thigh area and the other for the calf area. Throughout the rehabilitation procedure, this plate causes the thigh and calf region to vibrate continuously. Causes the proprioception to remain constant during rehabilitation. Enhancing range of motion and reducing pain as a result.

## MATERIALS AND METHODS

### Study design

This was an observational study.

### Study type

This was an analytical study.

### Study setting

This study was conducted at Karad.

### Study population

This study was undertaken with the post-operative knee stiffness patients fulfilling the inclusion criteria.

### Inclusion criteria

Post-operative knee stiffness patients undergoing physiotherapy rehabilitation.  
All genders.

### Study duration

This study was conducted from July 5, 2023 to January 30, 2024.

### Tools for data collection

A pre and post assessment sheet was used which included data of pain rated with VAS and altered ROM, measured with inch tape and goniometer.

### Determination of Pain

The patient was explained about the visual analogue scale (VAS) which contains a scale ranging from 0 to 10. '0' is the indication of no pain at all and '10' indicates severe pain. The examination was done under two circumstances, pain at rest and pain during driving bike. Patient was asked to mark between 0 to 10 on the basis of the pain he/she experiences first while in rest, and then while during an activity.

### Range of Motion

Range of motion of cervical and lumbar joints was measured using inch tape. The readings of pre-examination were noted and later post-examination readings were compared.

### Statistical Analysis

The outcome measures were evaluated at the start of the study. Using instat software analysis was done and VAS ( $P < 0.0001$ ), ROM for all the joints ( $p < 0.0001$ ) were all shown significant difference.

## RESULTS

The test results (Table 1), showed the superior effect of proprio kit as compared to no use of the proprio kit in view of visual analogue scale (pain assessment).

The test result (Table 2) and (Table 3) showed the effect of proprio kit as compared to conventional in view of range of motion assessment of knee joint respectively.

**Table:1 Vas Assessment**

Sr. no.	Age (yr.)	VAS	
		Customised	Conventional
1.	28	2	7
2.	30	3	10
3.	27	0	7
4.	35	2	9

5.	26	1	8
6.	32	0	6
7.	27	2	9
8.	32	1	8
9.	40	2	10
10.	37	1	8
11.	39	0	7
12.	26	2	7
13.	42	1	9
14.	39	0	7
15.	34	2	9
16.	46	1	8
17.	28	0	7
18.	43	2	9
19.	39	2	8
20.	25	1	7

**Table 2 : Range Of Motion Of Knee Joint**

Sr.no.	Age (yr.)	Knee Range of motion			
		Customised		Conventional	
		Flexion	Extension	Flexion	Extension
1.	28	135	10	100	5
2.	30	140	8	80	5
3.	27	138	10	50	7
4.	35	130	9	110	4
5.	26	142	7	70	7
6.	32	135	10	80	5
7.	27	145	8	90	4
8.	32	150	10	100	7
9.	40	135	10	100	5
10.	37	140	8	80	5
11.	39	138	10	50	7
12.	26	130	9	110	4
13.	42	142	7	70	7
14.	39	135	10	80	5
15.	34	145	8	90	4
16.	46	150	10	100	7
17.	28	135	10	100	5
18.	43	140	8	80	5
19.	39	138	10	50	7
20.	25	130	9	110	4

## CONCLUSION

The need of a proprio kit for the postoperative knee stiffness patient is a need of cause. And the results observed after the use of the proprio kit will not only reduce the pain rate but also improve the range of motion and help in rehabilitation.

## CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest concerning the content of the present study.

## ETHICAL APPROVAL

The institutional ethics committee of Krishna Vishwa Vidyapeeth "Deemed to be University", Karad has given the permission to initiate the project work  
Protocol number – 099/2023-2024

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