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Original Research Paper

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EFFECTIVENESS OF "VIMS KNEE TRACTION UNIT" FOR INCREASE IN KNEE JOINT SPACE IN PATIENTS WITH KNEE OSTEOARTHRITIS: AN OBSERVATIONAL STUDY

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ABSTRACT

BACKGROUND: Osteoarthritis (OA) is degenerative joint disease which causes deterioration of the joint structures leading to narrowing of the joint space. In general, the goals of the clinical management of knee degenerative arthritis are to provide pain relief and to maintain or to improve physical functionality and to increase the joint space. Hence the objective of the study was to find out the effect of "VIMS KNEE TRACTION UNIT" to increase joint space in patients with Knee Osteoarthritis.

MATERIALS AND METHODS: 10 patients of Knee osteoarthritis were taken of Grade >2 by Kellgren Lawrence Grade score and by ACR criteria. Radiographic X-ray were taken of each individual by using VIMS KNEE TRACTION UNIT with different degrees and taking images without traction and with traction. 6% of the participant's weight will be taken. Free weights will be used for applying knee joint traction therapy.

RESULTS: "VIMS KNEE TRACTION UNIT" using different degrees for patients with knee osteoarthritis was effective with applying knee joint traction therapy with free weights more than without traction. Results showed extremely significant effect for increase in knee joint space in patients with knee osteoarthritis with p value $p<0.0001$.

CONCLUSION: "VIMS KNEE TRACTION UNIT" is found increase in knee joint space with and without traction in patients with knee osteoarthritis.

KEYWORDS : Osteoarthritis knee, traction, free weighs.

INTRODUCTION

Osteoarthritic disease is defined as a slowly progressive joint disorder characterized by increasing joint pain, stiffness and limitations in range of motion (ROM). Osteoarthritis (OA) of the knee is also associated with pain or discomfort and limited functional abilities.[1]

Osteoarthritis is degenerative joint disease which causes deterioration of the joint structures leading to narrowing of the joint space. Progressively smaller joint space suggests worsening of Osteoarthritis. Osteoarthritis (OA) is the most common musculoskeletal disorder affecting the synovial joints. Radiographs shows increased joint space width and decreased subchondral sclerosis with joint distraction. Moreover, joint distraction showed significantly better results than debridement. Prevalence of OA in India is 22% to 39%. The efficacy & underlying mechanisms of joint distraction in treatment of OA Knee is found. Knee joint degenerative arthritis is a disease that causes pain, functional limitation, and disability, and its incidence is gradually rising, especially in the elderly population. The main symptoms that was observed among patients with knee joint degenerative arthritis is pain, and a high correlation has been found between pain and limited physical function during activities that use the knee in patients with degenerative arthritis. In general, the goals of the clinical management of knee degenerative arthritis are to provide pain relief and to maintain or to improve physical functionality.[2]

Previously studies demonstrated the effect of knee traction therapy on pain, physical function with knee OA patients. There was no scientific study and design made for knee joint traction therapy to measure at different angles.

However, based on previous knowledge there is no published experimental study who evaluated the effect of knee traction therapy to increase ROM and functional ability. Hence, it is imperative to focus on the effect of knee joint traction therapy on patients with knee OA. Therefore, there is need to find out the effectiveness of "Vims Knee Traction Unit" For Increase In Knee Joint Space In Patients With Knee Osteoarthritis: An Observational Study.

OUTCOME MEASURES:

Kellgren Lawrence grade score: The KL classification has been commonly used as a research tool in epidemiological studies of OA, the KL classification is typically applied specifically within the context of knee OA. The KL classification was originally described using AP knee radiographs. Each radiograph was assigned a grade from 0 to 4, which they correlated to increasing severity of OA, with Grade 0 signifying no presence of OA and Grade 4 signifying severe OA. Additionally, KL provided detailed radiographic descriptions of OA.[6]

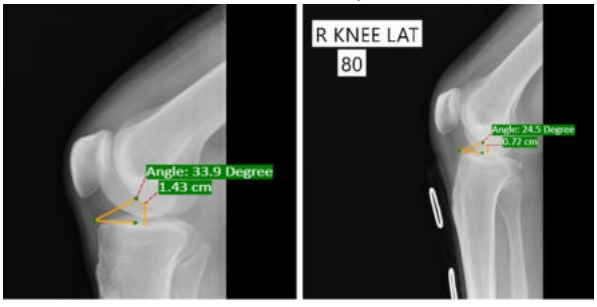
Procedure:

Patient will be in supine position. The participants will be asked to bend their hip and knee joints at 60 degrees or 70, 80, 90 degrees in the supine position. The different angles will be applied using VIMS knee traction unit and will be observed which angle will be effective for patients with Knee OA. The tibia and thigh will be secured with a strap and the stabilizing knee belt. And continuous knee joint traction treatment will be applied to tow the tibia in the cephalocaudal direction. The force that will be applied by the traction at approximately equal to 6% of the participant's weight. The interbone distance of the tibiofemoral joint will be measured with and without traction from the radiographs taken. The examiners will be the Physical Therapists. Informed consent will be taken from each participant before participation.

Figure 1: Vims Knee Traction Unit

Figure 2: Vims Knee Traction Unit Used For Knee Joint Traction Using Free Weights

Interbone Distance Of Tibiofemoral Joint:



80 degree with traction **80 degree without traction**

Recruitment of samples: This study selected 10 outpatients visiting the Tertiary hospital, who had been diagnosed with degenerative joint arthritis by orthopaedists, based on radiographic findings. This study's purpose and test method were fully explained to potential subjects and those who volunteered to participate were included. Samples is recruited according to inclusion and exclusion criteria.

Materials used: VIMS Knee traction unit, Free weighs.

Evaluation:
After obtaining clearance from the ethical committee from the Dr. Vithalrao Vikhe Patil Foundation, College of physiotherapy, Ahmednagar, instructions was given to the participants about study and its benefits and risk in their own language.

Consent was taken from participants. 10 samples were recruited for the study which was calculated statistically.

The participants was selected on basis of inclusion and exclusion criteria. Patient Aged 40-60 years, both genders were included in the study which was conducted in Dr. Vithalrao Vikhe Patil Memorial Hospital, Ahmednagar.

For the Evaluation, Participants will be assessed for Knee Osteoarthritis. Participants did not fulfil the inclusion criteria, patients refused to participate will be excluded.

Baseline measurement: demographic data, K/L grade.

Vims Knee Traction Unit was used by applying various angles 60, 70, 80, 90. Knee joint traction therapy was applied using free weighs and the radiographs were taken for the increased joint space in the knee joint with and without traction at various angles.

The data will be collected and analysed.

RESULT ANALYSIS:
Data was collected and analysed using Graphpad Instat version 3.06,32 bit for windows statistical software.
Collected data were analyzed using One way ANNOVA test.

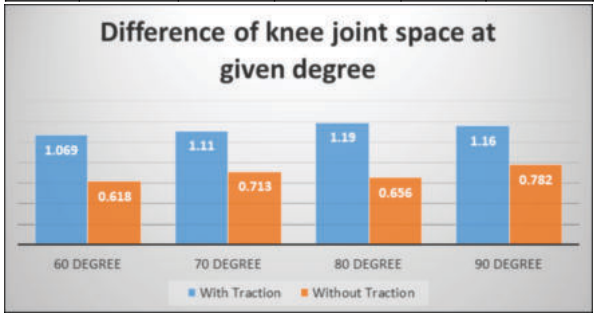
Descriptive statistics were used to compare the general characteristics of the participants.

All data were verified for normality using the Kuswal Wills test, and the paired t-test was used to compare values before and after the experiment.

The statistical significance level was set at $\alpha = 0.05$.

Table No. 1: Interbone distance of tibiofemoral joint with and without traction.

Degree		Mean ± SD	Kruskal Wallis Value	p value	Result
At 60 degree	Without traction	0.618± 0.1117	57.024	<0.0001	Extremely significant
	With traction	1.069±0. 088			
At 70 degree	Without traction	0.713±0. 1286			
	With traction	1.11±0.1 469			
At 80 degree	Without traction	0.656±0. 144			
	With traction	1.191±0. 2516			
At 90 degree	Without traction	0.782±0. 1988			
	With traction	1.161±0. 2365			



Graph No.1

Table No.2 : Comparison between group with and without traction of different angles

Dunn's Multiple Comparison Test:

Comparison	Mean Rank Difference	p value	Result
WT at 60 vs W/o at 60	-41.800	<0.01	Significant
WT at 70 vs W/o at 70	-36.750	<0.05	Significant
WT at 80 vs W/o at 80	-43.350	<0.001	Extremely significant
WT at 90 vs W/o at 90	-31.400	>0.05	Not significant

"VIMS KNEE TRACTION UNIT" using different degrees for patients with knee osteoarthritis was effective with applying knee joint traction therapy with free weights more than without traction. Results showed extremely significant effect for increase in knee joint space in patients with knee osteoarthritis with p value $p<0.0001$.

DISCUSSION
The study investigated the impact of VIMS knee joint traction unit on patients with knee osteoarthritis. According to the results, there was increase in knee joint space with and without traction in patients with knee osteoarthritis and decrease in pain was observed in this study after the application of knee joint traction therapy by applying VIMS knee traction unit. In the study, the application of VIMS knee

traction unit has the effective benefits seen after applying it. In this study we found out that VIMS Knee traction unit device was effective for using at different degrees like 60,70,80,90 degree by applying with and without traction with free weighs. On considering the results, the results tells that it is having significant result in 60 and 70 degree and extremely significant result in 80 degree but not significant in 90 degree using vims knee traction unit for increase in patients with knee OA.

Masaaki Takahashi et.al conducted the study on the Relationship between radiograph grading of osteoarthritis and the biochemical markers for arthritis in the knee osteoarthritis. The aim of the study was to investigate the relationship between the biochemical markers of arthritis and the radiographic grading of osteoarthritis (OA) in knees. Anterior–posterior knee radiographs and hand radiographs were taken in all patients. The radiographic grading of OA in the knee was performed by using the Kellgren–Lawrence criteria and the joint space width. The radiographic grading with the Kellgren–Lawrence scale revealed a significant relationship to the joint space width (P = 0.003): the joint space width decreased with increasing Kellgren–Lawrence grade. C-reactive protein (CRP), urinary pyridinoline, YKL-40, plasma matrix metalloproteinase (MMP)-3, MMP-9 and tissue inhibitor of metalloproteinases (TIMP)-1 were measured as the biochemical markers of arthritis. All biochemical markers had negative correlations with the joint space width, but only urinary pyridinoline had a significant correlation. In conclusion, CRP, pyridinoline, YKL-40, MMP-3 and TIMP-1 levels were each related to at least one of the radiographic gradings.

Basically, Knee joint traction Improves pain and function of degenerative arthritis improves the joint structure, Increases joint space and cartilage thickness, and improves overall function and maintains expansion, reduces bone loss, and improves knee function in patients with degenerative arthritis. A limitation was relatively small increase in the joint space of the knee joint after applying knee joint traction.

CONCLUSION:

"VIMS KNEE TRACTION UNIT" showed the significant effect for increase in knee joint space with and without traction in patients with knee osteoarthritis.

Conflict of interest: None.
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