Original Article

STUDY OF THE LATERAL RAISE IN FOOT WEAR FOR THE MANAGEMENT OF MEDIAL COMPARTMENT DEGENERATIVE JOINT DISEASE OF KNEE

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ABSTRACT:

BACKGROUND:

A wide spread disease, which may lead the patient to severe outcomes e.g. pain, loss of joint motion, inflexibility and even disability, is Knee osteoarthritis (OA). It is most common among adults of older age and should not be ignored at all. Literature does not show any clear pathogenesis for occurrence of Knee OA, but most of the indications point toward biomechanical stresses which may influence the articular cartilage and sub chondral bone.

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OBJECTIVE:

The Aim of this study is to become aware of the effects of physical therapy with and without laterally raised footwear in the management of medial knee osteoarthritis.

METHODOLOGY:

We have used experimental comparative study in 35 patients which were randomly selected from Department of Physiotherapy, Fatima Memorial Hospital, Shadman, Lahore. The study consisted of 2 groups, ***Group I (Experimental Group):*** In experimental group, patients were treated with laterally raised foot wear and physical therapy both. ***Group II (Control Group):*** Whereas in control group patients were treated by physical therapy alone. Kellgren and Lawrence (KL) scale was used to assess radiograph of the knee joints after an anteroposterior weight-bearing standing. The assessment of disease in patients was done by using the Western Ontario and McMaster Universities (WOMAC) Index, Muscle flexibility, Muscle strengthening and Tolerance scales.

RESULTS:

In group-I the mean age of patients observed was 59.52±13.66 years and 65±12.87 years in Group-II. In Group-I, 9 (52.9%) patients were males and 8 (47.1%) patients were females while in Group-II, 9 patients (50%) were male and 9 (50%) were female. In Group-I 2

(11.8%) patients used flat & open shoes, 6 (35.3%) used flat & close shoe, 3 (17.6%) patients used dress shoes and 2 (11.8%) used flat shoes. In Group-I, the frequency of patients wearing laterally raised foot wear in terms of duration was; 5 (29.4%) patients for 20 days, 4 (23.5%) for 24 days, 4 (23.5%) for 25 days, whilst 2 patients used it for 26 and 30 days respectively. Among 10 (58.8%) patients the use of lateral raised foot wear was intermittent wile in 7 (41.2%) patients the use of lateral raised foot wear was continuous. Overall Group–I presented better results compared to Group-II in this study.

CONCLUSION:

We have concluded in our study that the physical therapy with laterally raised footwear is a successful treatment in the management of medial knee OA. In laterally raised footwear the physical therapy is an effective method in terms of; relief of pain in patient, improvement in function by stiffness reduction and. this treatment method is recommended for the management of medial knee OA.

KEYWORDS:

Knee osteoarthritis, WOMAC scale and laterally raised foot wear.

INTRODUCTION:

A wide spread disease, which may lead the patient to severe outcomes e.g. pain, loss of joint motion, inflexibility and even disability is Knee osteoarthritis (OA). It is most common among adults of older age and should not be ignored at all. Literature does not show any clear pathogenesis for occurrence of Knee OA, but most of the indications point toward biomechanical stresses which may influence the articular cartilage and subchondral bone[1-3]. The involvement of medial compartment is most frequently observed, principally because during the midstance phase of gait, approx 60-80% load is distributed through it [4]. Any varus angulation malformation in medial compartment knee OA may cause the progression of OA triggering more load to the medial knee compartment. This increased load can further deteriorate articular cartilage and subchondral bone in target area [5]. One possible remedy for avoiding varus angulation has long been used via wedge osteotomy that shifts the weight away from the target knee compartment [6]. Various experimental studies for adapting conservative management techniques have been conducted in the recent years. One such alternative that helps to realign weight by non-operative methods is through foot wear modifications. These techniques are in practice and involve various shoe amendments like l-wedge insoles or shock-absorbing shoes with insoles[7, 8]. Literature shows not but only small data about clinical impact of lateral-wedge insoles on pain and functional status of patients with medial compartment Knee OA [9, 10]. The aim of the Present study is to assess minimizing pain, maintain or improve joint mobility, and decrease functional impairment. We investigated the short-term effects of full-length lateral-wedge insoles combined with shock-absorbing shoes on pain, stiffness and function in the treatment of symptomatic medial compartment knee OA.

PATIENTS & METHODS:

Study design used was randomized control trial. The study was conducted at the Physiotherapy Department, Fatima Memorial Hospital, Shadman, Lahore. It was based on time and all patients with knee osteoarthritis from medial compartment, visiting within 3 months were included.

There were two groups in the study in experimental group patients were treated with laterally raised foot wear and physical therapy together, according to the compatibility of the patients (which varied from 3^o to 7^o degree). Whereas in control group patients were treated by physical therapy alone. It was time based study, a total of 35 patients were enrolled within 3 months of data collection. Systematic random sampling technique was used (a type

of random sampling) in which all odd ordered patients were selected in group-I (1st, 3rd, 5th, 7th, etc.) and all even ordered patients were selected in group-II (2nd, 4th, 6th, 8th, etc.).

SAMPLE SELECTION CRITERIA:

Inclusion Criteria was the Symptomatically & radiologicaly diagnosed cases of primary medial compartment knee OA of any grade and stage, with age of 30 and above were taken. Whereas those patients were excluded having previous knee surgeries, ankle pathologies, which may interfere with the usage of orthosis, Recent trauma to the knee, Any limb length discrepancies, congenital anomalies or neuromuscular disorders of lower extremity or any other secondary cause of OA

METHODOLOGY AND FOLLOW UP:

After taking the necessary data an anteroposterior weight-bearing standing radiograph of the knee joints was assessed on the basis of Kellgren and Lawrence (KL) scale.

The patient's overall assessment of disease was done by using the Western Ontario and McMaster Universities (WOMAC) index, Muscle flexibility, Muscle strengthening and Tolerance scales. The evaluation was made at baseline and at months 1, 2 and 3. At baseline and at the end of the 3 months of the study, the patient was asked how many days during the previous 3 months he/she needed concomitant treatment (analgesics) because of a painful condition related to his/her knee OA. Compliance and tolerance were evaluated at the end of 1st, 2nd and 3rd months. The patients were asked whether they wore continuously-(The patients who were recovered from the disease (in 20 days) could not continue the use of laterally raised foot wear, but they were assessed till the last strategic follow-up), intermittently-(The patients continued the laterally raised foot wear till the end of follow up), or did not wear insoles. Additionally, the tolerance was evaluated on a 5-grade scale (no discomfort, mild, moderate, severe, very severe discomfort). Pain level was assessed using visual analog scale (VAS).

STATISTICAL ANALYSIS:

SPSS 20 was used to manage and analyze the data. Frequency tables, percentages and mean ± S.D were calculated for quantitative data. For qualitative data percentages, proportion and pie charts were used. Repeated measurement ANOVA was used to see the significance of both study groups over different follow ups. P-value ≤ 0.05 was taken as significant.

RESULTS:

The mean age of patients was 59.52±13.66 years in Group-I, and was 65±12.87 years in Group-II. In Group-I, 9 (52.9%) patients were males and 8 (47.1%) patients were females while in Group-II, 9 patients (50%) were male and 9 (50%) were female. In Group-I 2 (11.8%) patients used flat & open shoes, 6 (35.3%) used flat & close shoe, 3 (17.6%) patients used dress shoes and 2 (11.8%) used flat shoes. In Group-I, the frequency of patients wearing laterally raised foot wear in terms of duration was; 5 (29.4%) patients for 20 days, 4 (23.5%) for 24 days, 4 (23.5%) for 25 days, whilst 2 patients used it for 26 and 30 days respectively. Among 10 (58.8%) patients the use of lateral raised foot wear was intermittent wile in 7 (41.2%) patients the use of lateral raised foot wear was continuous.

Pain level for walking on flat surface was significantly different when measured on different intervals i.e.; (p-value=0.000), it was insignificant when compared within groups (Experimental vs. Control group). Pain level for going up or down stairs was significantly different when measured on different intervals i.e.; (p-value=0.000) as well as significantly different within groups (p-value=0.005) i.e. pain level in Experimental Group-I and in control group was different. Pain level at night, in bed was significantly different when measured on different intervals i.e.; (p-

value=0.000) and also different statistically among the groups (p-value=0.000). Mean pain for sitting or lying was significantly different when measured on different intervals i.e.; (p-value=0.000) and it was also different among experimental and control group significantly (p-value=0.001). Pain level for standing up was significantly different when measured on different intervals i.e.; (p-value=0.000) but was insignificant (p-value=0.052) among groups i.e. pain level in Experimental Group-I and in control group was same.

Stiffness level in morning as well as evening was significantly different at different intervals i.e.; (p-value=0.000 both), while when compared within groups, stiffness level in morning proved insignificant (p-value=0.404) while stiffness level in evening was statistically different (p-value=0.000).

Physical function for descending and ascending stairs was statistically different on different intervals i.e.; (p-value=0.000 each), when compared with study groups physical function for descending and ascending stairs was significant, thus quite different among experimental and control group (p-value=0.007 & 0.000 respectively). Physical function for rising from sitting was significantly different when measured on different intervals and also statistically different among both study groups i.e.; (p-value=0.000 & 0.029 respectively).

Physical function for standing was significantly different when measured on different intervals i.e.; (p-value=0.000) and also significantly different among both study groups i.e. Experimental Group-I and control group (p-value=0.004). Physical function for bending to floor was significantly different for different intervals and also for both groups i.e.; (p-value=0.000 and 0.025 respectively). Physical function for walking on flat, getting in/out of car, going shopping, putting socks/stockings on and off, rising from bed, lying in bed and getting in/out of bath were all significant variables i.e. different and improved after proceeding different intervals i.e.; (p-value=0.000 each). On the other hand physical function for walking on flat (p-value=0.692), lying in bed (p-value=0.112) and putting socks/stockings on (p-value=0.610) was same for both study groups. While physical function for getting in/out of car (p-value=0.000), going shopping (p-value=0.001), putting socks/stockings off (p-value=0.000), rising from bed (p-value=0.023), and getting in/out of bath (p-value=0.000) came out to be significant when compared with respect to study groups.

Further, Physical functions for sitting, getting on/off toilet, heavy and/or light domestic duties were all significantly different when measured on different intervals i.e.; (p-value=0.000). Also Physical functions for sitting (p-value=0.017), getting on/off toilet (p-value=0.047) and doing light domestic duties (p-value=0.002) were significant when compared for study groups but for heavy domestic duties, physical function was insignificant i.e. same for experimental and control groups (p-value=0.051).

When muscle flexibility for (Hamstring) was assessed at different intervals it came out to be statistically same in both groups at base line assessment and also after 1st Month, when it was assessed second time i.e. Base Line (p-value=0.733) & after 1st Month (p-value=0.595). At 2nd and 3rd month assessment, it was found that 8 patients were having low Tight (10-15%) muscle flexibility in Group-I & 16 patients were having muscle flexibility Low Tight (10-15%) in Group-II respectively.

When muscle flexibility for (Calves) was assessed at different intervals it was statistically same in both groups at base line measurement, after 1st, 2nd and 3rd Month. Base line assessment (p-value=0.360), 1st Month assessment (p-value=0.611), 2nd Month assessment (p-value=0.361) and 3rd month assessment (p-value=0.0085). When muscle flexibility for (Hip Extensors) was assessed at

different intervals it was statistically same in both groups at base line measurement and after 1st Month i.e. Base Line (p-value=0.648) & after 1st Month (p-value=0.541). At 2nd and 3rd month, 8 patients were having low Tight (10-15%) muscle flexibility in Group-I & 16 patients were having muscle flexibility Low Tight (10-15%) in Group-II respectively.

When muscle flexibility for (Quadriceps) was assessed at different intervals it was statistically same in both groups at base line measurement, after 1st and 2nd Month. Base line assessment (p-value=0.793), 1st Month assessment (p-value=0.458), 2nd Month assessment (p-value=0.388). When muscle flexibility was assessed again at 3rd Month, 13 patients were having Low Tight (10-15%) muscle flexibly in Group-I and in Group-II 18 people were having low Tight muscle flexibility.

When muscle flexibility for (Hip Flexors) was assessed at different intervals it was statistically same in both groups at base line measurement i.e. Base line assessment (p-value=0.793). After 1st Month assessment, 6 people in Group-I and 16 people in Group-II were having Low Tight (10-15%) muscle flexibility. After 2nd Month assessment, 8 people in Group-I and 16 people in Group-II were having Low Tight (10-15%) muscle flexibility. After 3rd Month assessment, 8 people in Group-I and 16 people in Group-II were having Low Tight (10-15%) muscle flexibility for Hip Flexors.

When muscle flexibility for (Hip Adductors) was assessed at different intervals it was statistically same in both groups at base line measurement, after 1st and 2nd Month. Base line assessment (p-value=0.051), 1st Month assessment (p-value=0.110), 2nd Month assessment (p-value=0.388). When muscle flexibility was assessed again at 3rd Month 13 patients were having Low Tight (10-15%) muscle flexibly in Group-I and in Group-II 18 people were having low Tight (10-15%) muscle flexibility.

The difference of Muscle strength for Dorsiflexors (p-value=0.000), Muscle strength for Quadriceps (p-value=0.000), Muscle strength for Hip Flexors (p-value=0.001), Muscle strength for Hip Adductors (p-value=0.023), Muscle strength for Medial Hamstring (p-value=0.000), Muscle strength for lateral Hamstring (p-value=0.0001), Muscle strength for Planter Flexors (p-value=0.000), Muscle strength for Hip Extensors (p-value=0.001) and Muscle strength for Hip Abductors (p-value=0.001) was significantly different when measured on different intervals. Muscle strength for Dorsiflexors (p-value=0.312), Muscle strength for Quadriceps (p-value=0.855), Muscle strength for Hip Flexors (p-value=0.958), Muscle strength for Hip Adductors (p-value=0.228), Muscle strength for Medial Hamstring (p-value=0.222), Muscle strength for lateral Hamstring (p-value=0.055), Muscle strength for Planter Flexors (p-value=0.749), Muscle strength for Hip Extensors (p-value=0.360) and Muscle strength for Hip Abductors (p-value=0.669) were all insignificant when compared for both study groups i.e. the muscle strength was same among both experimental and control groups.

DISCUSSION:

Knee osteoarthritis (OA) has alarming influences on human health that makes this problem a serious cause of morbidity. Older patients of age 65 years and above are on greater risk, as this disorder effects 13% people of this age period leading them to disability[11]. In our study the mean age in Group-I (Physical Therapy & Laterally raised foot wear) was 59.52 years and in Group-II (Physical Therapy) was 65 years indicating almost similar trend.

Many studies have pointed towards usage of laterally modified foot-wear usage as a beneficial non-operative treatment for medial compartment Knee OA. A study, based on similar objective showed that subjects, chosen for their randomized trial, did lessen the use of

nonsteroidal anti-inflammatory drugs (NSAID) after wearing wore bilateral lateral-wedge insoles. Yet, they did not report any relief for pain, stiffness or function as measured by the Western Ontario and McMaster Universities (WOMAC) Osteoarthritis Index [12]. Quite differently, a noticeable decrease in femorotibial angle and visual analog scale (VAS) score for subjective knee pain and also, enhancement in Lequesne index scores (a measure of disease severity) was observed among those women who wore bilateral lateral-wedge insoles with elastic strapping of the subtalar joint [13]. But no improvement was seen among those women who wore traditional shoe-inserted lateral-wedge insoles. It is assumed that a reduction in peak knee varus torque, external varus moment, and lateral thrust in patients with knee OA is caused by these insoles that may induce some technicality to reduce pain [14-16].

The basic cause of pain in medial compartment may be its deterioration that increases load and thus pain. For its remedy, a naive lateral wedge insole that distributes the load laterally, unloading it from medial compartment that reduces pain [17]. Several uncontrolled studies in Japan have shown benefits of laterally wedged insoles [18, 19]. Our study showed significant changes in pain level for various activities (working on flat surface, going up or down stairs, sitting or lying and for standing up right) with respect to study groups i.e. pain level reduces in Group-I (Physical Therapy & Laterally Raised foot wear) and when measured on different intervals of follow up as compared to Group-II (Physical Therapy).

In another pilot study, quite significant reduction was noted in abduction moment after usage of lateral-wedge shoe, which is considered as a parameter for dynamic medial load across the knee[156]. A parallel-design trial, in which comparison of neutral, non-wedged insole with lateral-wedge insoles showed decrease in drug use among patients using lateral wedge insoles, but pain reduction was nullified. But, null results cannot be confined to no effect of lateral-wedged shoes as there might be other reasons for this as well, including non-sufficient pain detection ability or compression of insert during wear. But due to its economical and effective results, even small benefits could contribute largely at public sector for their health.[15]

In our study physical function (present study) was compared in both groups for different physical tasks (Rising from sitting, Standing, Bending to floor, Putting on Socks, Rising from Bed, Getting in or out of Car, Getting in or out of Bath) and significant improvement in Group-I (Physical Therapy & Laterally Raised foot wear) as compared to Group-II (Physical Therapy alone) was observed at the end. A crossover trial to test for a small effect of a 5° lateralwedge insole was done that involved the same insole that was tested before [15]. Compared with a parallel-design trial, a crossover trial generally provides better statistical power to detect a small therapeutic effect.[20]

It was also observed that a 5° lateral-wedge insole had only a 13.8 point effect (95% CI 3.9, 31.4) on pain in patients with medial knee OA for decreasing adduction moment. Yet other studies support the statement that laterally wedged insoles contribute in improvement of pain and stiffness, though results varied with respect to setting and situation of each study. [22,23] Our study involved many dimensions for in-depth evaluation of role of wedged shoe in terms of pain, stiffness and physical functioning and found them quite beneficial for patients. Additionally muscle flexibility and muscle strength was also assessed at different intervals individually for each group. The results showed improvement in both dimensions with the passage of time among all patients and mostly better among patients of Group-1 (undergoing physical therapy and wearing wedged shoe both). A controlled but non-randomized study conducted by Toda et al showed decrease in pain among those

patients wearing lateral wedge insoles that support the results of our study. [20] In nutshell, irrespective of an argument for its utilization, a major literature support is with use of laterally wedged shoe for reduction in pain and stiffness, improvement in muscle strength and less use of drugs in patients of medial compartment knee OA.

CONCLUSIONS:

According to the present study it is concluded that the physical therapy with laterally raised footwear is successful treatment in the management of medial knee OA. The physical therapy with laterally raised footwear is an effective method in terms of patient's relief of pain, stiffness reduction and improvement in function. So, this treatment method is suggested for the management of medial compartment knee OA. Further multicentre studies are appealed for in similar regions to test the effectiveness of these treatment methods at national level.

TABLE-I: DESCRIPTIVE STATISTICS AND COMPARISON OF DIFFERENT PARAMETERS IN BOTH STUDY GROUPS OVER DIFFERENT FOLLOW UPS

	Base line		1st month		2nd month		3rd month		p-value
	G-I	G-II	G-I	G-II	G-I	G-II	G-I	G-II	
Walking on Flat Surface	5.40±2.98	7.66±2.52	4.10±1.85	6.73 ±2.57	2.90±1.37	6.00±2.36	1.10 ±0.73	4.86 ±2.55	0.052
Going up and down	7.70±1.76	8.00±1.36	5.80±1.47	7.00±1.36	4.40±1.17	6.26±1.22	2.20±1.75	5.13±1.18	0.005*
Pain At Night while in Bed	6.84±1.40	7.16±1.82	5.38±1.19	6.16±1.54	3.69±0.85	5.16±1.58	2.00±1.08	4.33±1.41	0.000*
Pain sitting or lying	7.00±0.81	5.88±2.67	5.69±.854	5.00±2.27	4.15±1.21	4.33±1.94	2.15±1.46	3.33±1.64	0.001*
Pain Standing Up	6.30±3.36	7.00±1.73	5.00±2.74	5.60±1.88	3.50±2.32	4.46±1.88	1.50 ±1.43	3.86±1.59	0.053
Stiffness morning	4.80±4.13	8.20±1.32	3.90±3.38	7.06±1.27	2.40±2.36	5.93±.96	1.00 ±1.24	5.13±1.12	0.404
Stiffness evening	7.76 ±.72	7.83 ±1.65	6.07 ±.95	6.83 ±1.65	4.30 ±1.60	5.83 ±1.72	2.30 ±1.31	4.50 ±1.82	0.000*
PF (Descending stairs)	7.10 ±1.72	7.06±2.25	5.30±1.76	5.53±2.16	3.70±1.70	4.66 ±1.87	1.40±1.50	3.66±1.79	0.007*
PF (Ascending stairs)	7.92±1.32	6.72±2.73	6.38±1.44	5.33±2.40	4.69±1.60	4.55±2.09	2.69±1.70	3.72±1.93	0.000*
PF (Raising from sitting)	6.60 ±1.95	7.33±1.67	5.10±1.96	5.93±1.48	3.60±1.83	5.06±1.33	1.8±1.03	4.00±1.46	0.029*
PF (Standing)	6.61±1.12	6.38±2.65	5.23±1.16	5.38±2.32	3.92±1.49	4.38±2.11	2.07±1.25	3.50±1.88	0.004*
PF (Bending to floor)	6.60±2.45	7.60±1.35	5.10±2.28	6.20±1.08	3.80±1.68	5.20±1.20	1.90±1.44	4.06±1.16	0.025*
PF (Walking on Flat)	5.10±2.84	7.73±1.16	4.10±2.18	6.40±1.12	3.10±2.18	5.40±1.12	1.50±1.43	4.46±1.30	0.692
PF (Getting into out of car)	6.61±1.32	6.27±2.56	4.92±1.25	5.38±2.27	3.61±0.96	4.55±1.88	1.76±0.43	3.61±1.57	0.000*
PF (going Shopping)	6.20±1.81	6.93±1.86	4.20±2.04	5.80±1.82	2.90±2.28	4.66±1.83	1.40±1.64	3.93±1.70	0.001*
PF (Putting on Socks)	4.90±2.88	6.60±2.26	3.20±2.09	5.46±1.76	2.10±1.52	4.46±1.76	1.10±0.73	3.20±1.47	0.610
PF (Raising on bed)	5.9±1.79	7.20±1.89	4.70±1.70	5.93±2.18	3.20±1.68	4.93±2.18	2.00±1.05	4.40±1.80	0.023*
PF (Taking of socks)	6.69±0.85	5.50±2.57	5.15±0.80	4.55±2.20	3.38±0.76	3.66±1.94	1.69±0.63	2.61±1.57	0.000*
PF (Lying on bed)	5.00±2.66	6.20±1.01	3.50±1.84	5.20±1.14	2.20±1.22	4.20±1.14	1.00±0.66	3.33±1.39	0.112
PF (Getting in/out of bath)	6.00±1.22	5.50±2.50	4.53±1.26	4.61±2.30	3.00±1.22	3.72±2.08	1.46±0.87	2.83±1.88	0.000*
PF (Sitting)	5.90±1.66	6.66±1.54	4.40±1.07	5.40±1.45	3.30±1.33	4.26±1.43	1.30±0.94	3.40±1.24	0.017*
PF (using toilet)	5.30±3.46	6.53±2.16	3.20±2.29	5.53±2.16	2.00±1.82	4.66±1.87	0.90±0.56	3.80±1.61	0.047*
PF (Heavy domestic duties)	6.50±3.65	8.36±1.43	4.90±2.88	7.36±1.43	3.10±1.96	6.18±1.53	1.80±1.39	5.54±1.12	0.051
PF (Light domestic duties)	6.30±2.11	6.63±1.62	5.00±1.33	5.81±1.47	3.40±0.84	5.00±1.26	1.80±1.22	4.00±1.26	0.002*

Muscle Strength (Dorsiflexor)	4.50±0.57	4.25±0.44	5.00±0.00	4.87±0.34	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	0.312
Muscle Strength (Quadriceps)	4.05±0.55	4.00±0.84	4.64±0.49	4.61±0.60	5.00±0.00	4.94±0.23	5.00±0.00	5.00±0.00	0.855
MS (Hip Flexor)	4.50±0.57	4.50±0.73	5.00±0.00	4.87±0.34	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	0.958
MS (Hip Adductors)	4.50±0.57	4.87±0.34	5.00±0.00	4.87±0.34	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	0.228
MS (Medial Hamstring)	4.29±0.46	4.05±0.41	4.76±0.43	4.7±0.54	5.00±0.00	4.94±0.23	5.00±0.00	5.00±.00	0.222
MS (Lateral Hamstring)	4.75±.50	4.00±.51	4.75±0.50	4.87±0.34	5.00±0.00	5.00±.00	5.00±.00	5.00±.00	0.055
MS (Planter Flexors)	4.47±.71	4.55±.70	4.88±0.33	4.83±0.51	5.00±0.00	4.94±.23	5.00±.00	5.00±.00	0.749
MS (Hip Extensors Combined)	4.50±0.57	4.12±0.61	4.75±0.50	4.75±0.44	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	0.360
MS (Hip Extensors Gluteus)	4.35±0.70	4.00±0.48	4.70±0.46	4.61±0.60	5.00±0.00	4.94±0.23	5.00±0.00	5.00±0.00	0.121
SM (Hip Abductors)	4.50±0.57	4.37±0.50	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	5.00±0.00	0.669

PF= Physical function, MS = Muscle Strength , * = significant of group

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