

Effects of bilateral knees to chest versus standing forward flexion stretching on low back flexibility in healthy adults

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Purpose and Objective

- To document the effects of stretching on the muscles in the lumbar region of the back in healthy adults.
- To compare standing forward flexion (SFF) and bilateral knees to chest (BKTC) to determine the effectiveness of stretching to improve lumbar spine flexibility.

Justification of Study

- The positive outcomes for stretching include:
 - Increased range of motion¹⁻³
 - Decreased stiffness^{1,2}
 - Decreased risk of injury^{1,2}
- No documented risks of stretching
- SFF and BKTC are commonly used in the clinical setting

Review of Literature

- Most effective stretch for lumbar flexibility has not been established
- Standing forward flexion used often in the literature for stretching and measurement position⁴⁻⁸
- Bilateral knees to chest is common in textbooks as a method for stretching.⁹⁻¹²

Subject Population

- 17 participants
- Inclusion criteria:
 - Enrolled at UTC during Fall of 2007
 - Ages 18 to 30
 - Males and females
 - Able to participate for the entire 6 weeks
 - Forward flexion ROM less than 50°
- Exclusion criteria:
 - Back pain currently or within the past 6 months with medical management
 - Previous back surgery
 - Diagnosed spinal deformity or disease
 - Obvious leg length discrepancy or pelvic obliquity

Methods

- Informed consent
- Initial screening
- 2 randomized groups (9 in SFF and 8 in BKTC)
- Initial data collection

Methods

- Measurements: Double inclinometer
 - Standing forward flexion position (no device)
 - Once a week for all groups
 - Stretch groups will have already stretched prior to measurement
 - Permanent marker dots on T12 and S2 spinous processes
 - Average of 2 measurements will be used



Methods

- Stretching Parameters:
 - Stretch 5 days per week for 6 weeks
 - Hold for 30 seconds repeat 3 times once a day

Methods

- Standing forward flexion group:
 - Stand on platform with tibia resting on the positioning device to prevent the knees from fully extending and the hamstrings from hindering the stretch



Methods

- Bilateral knees to chest group:
 - Lay on mat with both knees to chest
 - Head resting on mat
 - Posterior pelvic tilt and flattening of the lumbar spine



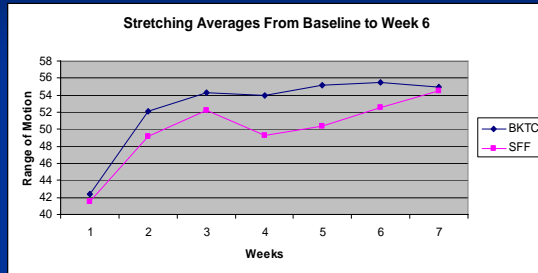
Statistics

- Dependent variable: Lumbar spine ROM
- Independent variables: Treatment and Time
- Analyzed using repeated measures ANOVA
 - 2 levels of group (BKTC and SFF)
 - 7 levels of time
 - Pretest and Rx1 - Rx6

Results

- ANOVA
 - Statistical significance for time for both groups
 - P-value 0.001
 - No difference between groups ($p > 0.05$)
- Post-Hoc Paired t-test
 - Statistical significance for:
 - SFF participants from pretest to week 6 ($p = 0.001$)
 - BKTC participants from pretest to week 6 ($p = 0.005$)
 - No difference between groups at week 6 ($p > 0.05$)

Results



Discussion

- Both groups were the same at baseline and at the end of the study
- Improvement ranged from:
 - BKTC: 4 - 23.5 degrees
 - SFF: 5 - 20.5 degrees
- Improvement was clinically significant for all participants
- No difference was found between the 2 groups
- Loss of one participant
- Outlier measurement in week 3
- Stretch requirements of certain muscles

Limitations

- Small sample size
- Change in level of physical activity
- Randomization
- Stretching and measurement times
- Stretching attire
- Repalpation!!
- Inclinometer
- Blinding
- Knowledge of inclusion criteria and incentives
- Supervision

Limitations

- Bilateral Knees to Chest
 - Towel roll for hip pain
 - Arm position
 - Amount of pull

Limitations

- Standing Forward Flexion
 - Quad "burn"
 - Arm position
 - Amount of pull

Alterations

- Larger sample size
- Longer time frame
- More than one stretch per day
- Different stretches

Conclusion

- Stretching improves ROM
- No difference between groups

THANK YOU!!

- Dr. Walker
- Dr. Dale
- All Participants

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Questions?

