一、請閱讀下列文章後，以 100 字描述其摘要。(25%)

It is generally accepted that muscles play an important role in the support and protection of joints. Criso and Panjabi suggested that muscles that have direct attachments to the vertebrae are responsible for the segmental stability through the control of the neutral zone. The deep muscles of the neck, which act like dynamic ligaments, play an important role in maintaining the stability of the cervical spine. Several studies demonstrated that neck muscle atrophy is strongly correlated with neck pain. However, the causal association between neck muscle atrophy and neck pain still remains unexplained. In the past decade, several researchers reported that dynamic strengthening of the neck muscles for 6 to 11 weeks in patients with chronic neck pain resulted in reduced neck pain, increase in isometric neck muscle strength, and decrease in disability. However, the efficacy of active strengthening exercises for management of chronic neck pain has been uncertain in the previous studies. In some studies, only minor or short-term improvements were induced with active exercise, and most of the studies did not have control groups. Moreover, the relatively small number of patients and the lack of long-term, objective changes did not allow firm conclusions to be made on the overall efficacy of the treatment programs. There is a lack of well- designed randomized controlled trials to investigate the efficacy of rehabilitation, especially in the management of chronic neck pain. The current study aimed at evaluating the efficacy of a specific exercise program for the management of patients with chronic neck pain. The efficacy of exercise program was assessed subjectively by an adapted Chinese version of neck disability score, verbal numeric pain scale, and objectively by isometric muscle strength measured by a multicervical rehabilitation unit.

二、請翻譯下列文章。(25%)

Nature **422**, 759 - 765

Molecular motors

MANFRED SCHLIWA AND GÜNTHER WOEHLKE

Life implies movement. Most forms of movement in the living world are powered by tiny protein machines known as molecular motors. Among the best known are motors that use sophisticated intramolecular amplification mechanisms to take nanometre steps along protein tracks in the cytoplasm. These motors transport a wide variety of cargo, power cell locomotion, drive cell division and, when combined in large ensembles, allow organisms to move. Motor defects can lead to severe diseases or may even be lethal. Basic principles of motor design and mechanism have now been derived, and an understanding of their complex cellular roles is emerging.

見背面

三、一般醫學論文投稿時，必須撰寫摘要，以下 1-4 子題之答案即可構成本閱讀文章之摘要，請將此 4 子題之答案連接寫成一篇摘要。醫學論文之摘要是有字數限制的，因此，1-4 子題答案總字數請勿超過 500 中文字。若有不易以中文表達之名詞，可以原文作答，其換算之中文字數由閱卷者統一決定。(請在答案紙上畫格子，以便計算字數)

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5. 請給本文 4 個以上關鍵詞。(5%)
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Passive Versus Active Stretching of Hip Flexor Muscles in Subjects With Limited Hip Extension: A Randomized Clinical Trial

Michael V Winters, Charles G Blake, Jennifer S Trost, Toni B Marcello-Brinker, Lynne Lowe, Matthew B Garber, Robert S Wainner

Method

Subjects

Forty-five subjects (23 male, 22 female) with lower-extremity injuries or low back pain were enrolled in the study. All subjects were recruited from the Brigade Gym patient profile program through the Physical Therapy Clinic at the Brooke Army Medical Center (BAMC), Fort Sam Houston, Texas. The profile program is for soldiers who are not able to participate routinely in army physical fitness training due to their musculoskeletal complaint. Subjects completed a questionnaire containing questions about their sex, age, height, weight, and lower-extremity pain and were screened for decreased ROM and presumed hip flexor tightness bilaterally using the modified Thomas test. Subjects were classified as having tight hip flexor muscles if their thigh was above 0 degrees in relation to the treatment table. The limb demonstrating the greatest amount of decreased ROM served as the limb of interest for study purposes. If hip flexor tightness was thought to be equal bilaterally, the side of the limb of interest was chosen randomly by flipping a coin. A lower-quarter neurological screening that included manual muscle testing, sensory testing, and testing of muscle stretch reflexes also was performed at this time.

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The primary inclusion criterion was the presence of what we thought were tight hip flexor muscles in the presence of a lower-extremity injury or low back pain. Decreased ROM thought to be due to hip flexor muscle tightness has been documented in patients with these disorders,1–3 and there is concern that the presence of tightness may lead to further injury.11 Our subjects also were required to be between the ages of 18 and 65 years and eligible for military health care. No subjects were excluded from the study due to neurologic abnormalities noted during the screening examination or due to an inability to correctly perform the stretching procedures used in this study.

If the subjects met the inclusion criterion, they were asked to participate in the research study. Prior to being enrolled in the study, all subjects were advised of potential study risks, which could include the development of mild muscle soreness up to 3 days, and they signed an informed consent document.

Design

This study was a randomized clinical trial. The independent variables in this study were group (passive and active) and time (baseline and 3 and 6 weeks after the start of the study). The dependent variable was hip extension ROM measured in the modified Thomas test position.

Instrumentation

All ROM measurements were obtained using a universal goniometer.

Procedure

Subjects were randomly assigned, using a computer-generated random number list, to either a passive stretching group (n=23) or an active stretching group (n=22). Although examiners were blinded to group assignment, the randomization list was not concealed from study personnel who made the group assignments from the list.

Modified Thomas test. Hip flexor tightness in the limb of interest was measured with the modified Thomas test using the following procedure: The subjects were instructed to sit as close to the edge of the table as possible. Subjects used their hands to bring their knees to their chest and then slowly rolled backward on the table. While holding this position, one lower limb was released, allowing the hip to extend toward the table while resting the ipsilateral arm on the contralateral shoulder. The leg and knee of the limb being measured were allowed to hang off the edge of the table unsupported. While the subject maintained a posterior pelvic tilt, one examiner attempted to visually ensure that the lumbar spine was flat, preventing the limb from abducting. The examiner observed and palpated the thigh in an effort to ensure that it was completely relaxed before a second examiner measured hip ROM. Hip ROM was measured 3 times, and an average value was calculated. The goniometer was reset to zero before each

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measurement. In our study, the scale of the goniometer was covered so as to mask the second examiner, and a third examiner read and recorded the measurements. Both the examiner who took the measurements and the examiner who read and recorded the measurements were masked to the subjects' group assignment.

Intervention. Subjects received 1 of 2 different stretching procedures based on their group assignment. The passive stretching group performed the modified lunge (Fig. 1) and the prone static hip stretch (Fig. 2). The active stretching group did prone leg lifts with the knee bent (Fig. 3) and with the knee straight (Fig. 4).

For both active and passive stretching groups, an investigator provided subjects with written instructions that included figures depicting their respective stretches and then demonstrated each stretching procedure. The subjects then did the movements with the investigator present. The investigator observed the subjects and corrected any discrepancy in an effort to ensure consistent performance of the exercises. Subjects were asked to maintain their daily activities, with the exception of adding one session of hip flexor stretching per day.

Subjects were re-examined within 1 week after enrolling in the study and demonstrated the assigned stretching procedures. An investigator observed the subjects performing the procedures and made corrections as needed. Subjects were asked about their adherence to their stretching regimen and were reminded of its importance, but adherence was not monitored. Subjects returned after 3 and 6 weeks, and hip extension ROM measurements in the modified Thomas test position were obtained in a manner identical to that previously described.

Results

Thirty-three subjects completed the study. Fifteen subjects in the passive stretching group (mean age=24.9 years, SD=6.5) and 18 subjects in the active stretching group (mean age=22.6 years, SD=3.7) were available for measurement at baseline and 3 and 6 weeks after the start of the study.

For subjects who completed the study, there were no differences in age or weight between the 2 groups at baseline. Mean hip extension ROM measured in the modified Thomas test position at baseline was –11 degrees (SD=4) for the passive stretching group and –14 degrees (SD=16) for the active stretching group. The mean differences between groups at 3 and 6 weeks were 4 and 2 degrees, respectively. The results of the mixed-model ANOVA showed the interaction effect (group x time) and main effect for group were not significant. There was a main effect for time ($P<.0001$).

Post hoc testing for the main effect of time was significant for the pair-wise comparison between baseline and 3 weeks and between baseline and 6 weeks, but was not significant for the pair-wise comparison between 3 weeks and 6 weeks. In the active stretching group, average ROM improved by 12 degrees in the active stretching group and by 13 degrees in the passive stretching group from baseline to 3 weeks.