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Study of Alleviating and Exacerbating Movement in Nurses with non Specific Chronic Low Back Pain: The Sahrmann's Approach

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This research was conducted to study of alleviating and exacerbating movement pattern and postures in nurses with non specific chronic low back pain. Study's population was 53 persons of woman nurses with non specific chronic low back pain. Assessment was done in 2 parts. The first part was consisting of questions about individual characteristics and another part was physical assessment based on Sahrmann's approach. Results show that standing and walking were exacerbating symptoms more than another position and supine lying and sitting were alleviating symptoms more than another position. In non-specific chronic low back pain we don't observe special pathology or disease. But repetitive movements and sustained postures affect musculoskeletal and neural tissue and induced musculoskeletal pain. Human movements are done in movement patterns. So, if we can identify and correct the positions that changed movement patterns we can restore optimal musculoskeletal health.

Key words: Movement pattern and posture, non specific chronic low back pain, lumbar assessment, movement impairment syndrome

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INTRODUCTION

Low Back Pain (LBP) is a substantial health problem that affects up to 80% of the adult population (Walker *et al*., 2004). Several classification systems have been proposed for subdividing non-specific LBP patients by means of clinical examination. In physiotherapy, three are of particular interest inasmuch as they (1) are sufficiently detailed to have implications for choice of treatment for the individual patient and (2) have been tested for reliability and validity (Delitto *et al*., 1995; Maluf *et al*., 2000). All three are treatment-oriented systems in that they place patients in categories with the purpose of determining an appropriate intervention. The classification process differentiates between specific spinal pathology, nerve root pain and simple or Non-Specific Low Back Pain (NSLBP) (Kent and Keating, 2005).

Most of the research organizations suggest more staging the problem based on the symptom duration into acute, sub acute or chronic (Spitzer *et al*., 1987; Bogduk and McGuirk, 2002). NSLBP represents about 85% of LBP patients seen in primary care (Deyo and Phillips, 1996) and the vast majority of LBP patients seen by physical therapists are classified under this group. The goal for the therapist managing LBP patients is to select the appropriate treatment for each patient. The clinical reasoning process required to achieve this goal starts with a diagnostic classification that place the patient into a recognizable group with a particular pattern of signs and symptoms. The medical professions in primary care most commonly classify these patients with patho-anatomically labeled categories. However, there appear to be a wide diversity in the opinion as to the patterns of signs and symptoms that constitute a category (Kent and Keating, 2003).

Disability related to LBP is a major problem in the Western World (Leboeuf-Yde *et al*., 2003). Studies from a variety of countries investigating the long-term course of LBP show that most patients will improve rapidly (Pengel *et al*., 2002). Further improvement is apparent until about 3 months. Thereafter, levels for pain, disability and return to work remains almost constant. Six months after an episode, 60-70% of patients will have experienced relapses of pain and 16% will be sick-listed. As much as 62% will still be experiencing pain after 12 months (Pengel *et al*., 2002; Hestbaek *et al*., 2003). Nurses are among those professionals with the highest incidence rates of LBP (Kumar, 2004). Bending, twisting, lifting heavy weights and making forceful movements were shown to be related to LBP (Punnett *et al*., 1991). Combined lifting, prior injury and being overweight were found to be risk factors for WLBI among nurses (Fuortes *et al*., 1994).

Gombatto *et al*. (2006) conducted a study on the differences in the pattern of hip and lumbopelvic motion between male and female with LBP. They have found male subjects exhibited a greater percent of maximum lumbo-pelvic rotation during the first stage of movement and had more LBP comparing to female. Van Dillen *et al*. (2003a, b) examined modifying patient-preferred movement and alignments of the lumbar spine during patient examination. They observed modifying the symptom-provoking movements and alignments of the spine during symptom testing resulted in a decrease in symptoms. Burnett *et al*. (2004) observed motor control and kinematics of lower lumbar spine in the LBP patients was differing from healthy patients. The purpose of present study was to determine the alleviating and exacerbating movement pattern and postures in nurses with non specific chronic low back pain.

MATERIALS AND METHODS

Patients: A total 53 female nurses (men age of 33.75±5.86 years), with non-specific chronic low back pain participated in the study on the 2 years course from 2006 to 2008. Those subjects that had symptoms (pain or paresthesia) related to a low back problem in the region of the lower back, proximal lower extremity or distal lower extremity took participate in this study. Inclusion criteria were as follow: all of female nurses that work at least for one year and had LBP at least for one month. Those nurses that had pregnancy, sever kyphosis or scoliosis, spinal stenosis, a history of spinal surgery, cancer, rheumatoid arthritis, ankylosing spondylitis, neurological disease, disc herniation, inability to stand, walking without an assistive device and leg length discrepancy were excluded from the study.

The study was approved by the Ethics Committee of the Ahwaz Jondishapour University of Medical Sciences and all the participants read and signed an informed constant statement. For tests of alignment, the patient was asked to assume the test position for at least 10 sec and report if symptoms were increased, decreased or stayed the same (Maluf *et al*., 2000; VanDillen *et al*., 2005). For assessment, a trained physical therapist used a standard examination procedure. The positions and movements that assessed in subjects and percent of changing in symptoms were shown in Table 1 and 2.

Statistical and data analysis: after data collecting, they were coded and computer assisted analysis was performed. Descriptive statistics were calculated for patient characteristics (height, weight, age). Frequency

distributions of subject's responses (increased, decreased and same) were generated for each of the 15 tests. All analysis has been done using SPSS 13.0.

Table 1: Assessed positions and movements and related frequency distribution

Positions	Same	Increase	Decrease
Sitting	13 (24.5)	18 (34.0)	22 (41.5)
Forward flexion	26 (49.1)	15 (28.3)	12 (22.6)
Walking	21 (39.6)	31 (58.8)	1 (1.9)
Standing	4 (7.5)	49 (92.5)	----
Raising arms overhead	40 (75.5	8 (15.1)	5 (9.4)
Sitting in lumbar extension	21 (39.6)	24 (47.2)	7 (13.2)
Back lying with legs extended	16 (30.2)	14 (26.4)	23 (43.4)
Sitting with abdominal contraction	13 (24.5)	28 (52.8)	12 (22.6)

Values in brackets are shown percentage

Table 2: Assessed position and movements and related frequency distribution

Positions	Yes	No
Symptoms are unilateral or more in one side?	35 (66.0)	18 (34.0)
Rotation increases symptoms?	30 (56.6)	23 (43.4)
Rotation with lumbar extension increases symptoms?	18 (34.0)	35 (66.0)
Move from supine to sit increases symptoms?	27 (50.9)	26 (49.1)
Move from sit to supine increases symptoms?	46 (86.8)	7 (13.2)
Move from sit to stand increases symptoms?	43 (81.1)	10 (18.9)
Move from stand to sit increases symptoms?	45 (84.9)	8 (15.1)

Values in brackets are shown percentage

RESULTS

In this study 53 female nurses with non specific chronic low back pain were participate. The mean of their demographic data include: for age was 33.75±5.86 year, for height was 160.58±6.79 cm and in case of weight was 63.51±10.58 kg. Results from frequency distributions showed standing and walking more than another positions exacerbating symptoms lying and sitting more than another positions alleviating symptoms. Assessed positions and movements and percent of their symptoms were as follow: 41.5% of subjects were better with sitting, 34% had increased symptoms and 24.5% of subjects didn't show any change in their symptoms with this position. 22.6% of subjects were better with forward flexion, (Fig. 1A) 28.3% had increased symptoms and 49.1% didn't report any change with this position.

Walking, was increased symptoms in 58.5% of subjects, but didn't change symptoms in 39.6% of subjects. Only one person (1.9%) was better with walking. 92.5% of nurses reported that their symptoms were exacerbated with standing (Fig. 1B) and in 7.5%, standing

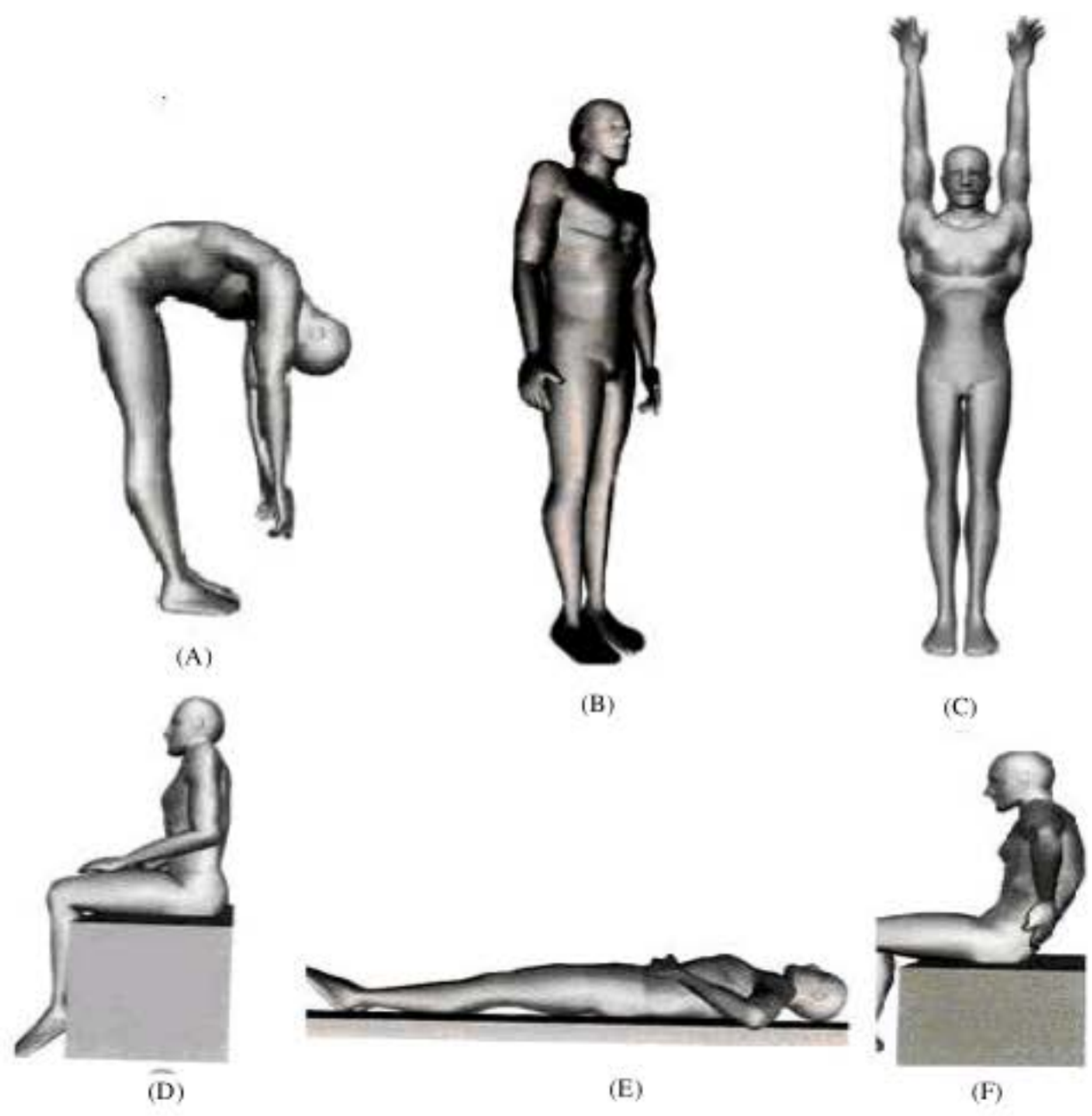

Fig. 1: (A) Forward flexion, (B) standing position, (C) raising hands over head (D) sitting with extension in lumbar spine, (E) back lying with legs extended and (F) sitting with abdominal muscle contraction

didn't change their symptoms. The 9.4% of subjects were better with raising hands over head (Fig. 1C), 15.1% had increased symptoms and this position didn't change symptoms in75.5% of subjects. Sitting with extension in lumbar spine (Fig. 1D) was increased symptoms in 47.2% of subjects.13.2% were comfort in this position and 39.6% of subjects didn't have change in their symptoms with this position. Symptoms were decreased in 43.4% of subjects with back lying with legs extended (Fig. 1E), 26.4% of subjects had increased symptoms and 30.2% hadn't change in their symptoms.

Sitting with abdominal muscle contraction (Fig. 1F) was increased symptoms in 52.8% of subjects, 22.6% were better in this position and 24.5% hadn't change in their symptoms. The symptoms were unilateral or more in one side in 34% of subjects and 66% had bilateral symptoms. Lumbar rotation increased symptoms in 43.4% of subjects but 56.6% hadn't change in their symptoms with rotation. Lumbar extension with rotation was exacerbated symptoms in 66% and didn't change symptoms in 34% of subjects. 49.1% of subjects reported their symptoms were increased with supine to sit position and 50.9% hadn't change in their symptoms. Sitting to supine position didn't change symptoms in 86.8% of subjects and 13.2% have pain with this change position? Sit to stand position didn't change symptoms in 81.1% of subjects and 18.9% had pain with this change position. 84.9% of subjects reported their symptoms didn't change with stand to sit position and 15.1% had increased symptoms (Table 1, 2).

DISCUSSION

Standing and walking were exacerbating symptoms more than another positions, these patients often report occasion flare ups in their symptoms. Patients who have such a clinical picture are patients who may repeatedly stress tissue in lumbar region in specific direction as a result of movement and alignment strategies that they are performing continually throughout their day. As a result symptoms appear to be long- lasting in nature, varying in intensity across time with regular activities, with occasional distinct flare-ups often associated with an increase or change in regular activity levels.

Wintersm *et al*. (2004) in a research work on patient with low back pain and lower-extremity injuries showed that passive and active stretching are equally effective for increasing range of motion, presumably due to increased flexibility of tight hip flexor muscles. Vieira *et al*. (2006) conducted a study on the hospital injury records were examined in a retrospective study as well as a validated questionnaire was administered to 47 nurses. Their methodology proposed for job evaluation and to design a participatory ergonomic intervention aiming at reducing low back injuries in nursing jobs. They suggested improvements in lifting devices, biomechanical training, bigger rooms, adequate set-up and additional staff a. Present finding approach is based on Sahrmann's approach that people develop to more spines in a specific direction as the result of performing movements and assuming, sustained positions repeatedly during their everyday activities. Present findings aren't unexpected based on Sahrmann's approach, because nurses do most of their work activities at standing position or walking, so, this sustained postures and repeated movements that they had on their daily activities, may be contributing to the patient's LBP.

If movements have done at the optimal kinesiologic standard position, tissue damage doesn't occur (Van Dillen *et al*., 2003a, b). Human movements involve similar internal and external forces, as do mechanical systems. In mechanical systems, maintaining precise movement is important (Norton *et al*., 2004). The effect of repeated movements and sustained postures modify the kinesiologic model so that it becomes a kinesiopathologic model. The best method for muscle testing is clinical observation and observational assessment (Bullock *et al*., 2000). Observation and measurement of osteokinematic movements are part of standard assessment that physiotherapist does (Sahrmann, 2005). Reproducible motions of the spine or extremities can produce the symptoms that elicit stress or movement. The site of the symptoms is particularly susceptible to movement because it becomes more flexible than the other sites of which motion also occurs. This susceptibility to movement further exaggerates the flexibility of the site because it is repeatedly subjected to motion. Most movements involve the participation of multiple segments and the relative contribution of each segment is a function of its mechanical characteristics. Thus most spine dysfunction occurs because of excessive relative flexibility, particularly at specific segments, rather than at the segment of reduced flexibility. The reduce flexibility of some segments invariability contributes to compensatory motion at the most flexible segments most often back pain subsides without direct treatment to the spine itself. After the correction is made, the spine is no longer subjected to the traumatic stresses.

CONCLUSION

In conclusion, given the focus on reducing LBP in nursing population in the work place have been relatively ineffective. Perhaps the emphasis should shift toward identifying factors associated with LBP and developing targeted early interventions by eliminating predisposing factors. Chronic unspecific low back pain is possible to clearly be classified physically in nursing population. This functional classification is necessary to aid decision

making as to which specific conservative approach such as physical therapy, should be used. There is conflicting evidence regarding the efficacy of physical therapy for patients with chronic low-back pain. When used combined with spinal manipulation, exercise and other co-interventions, it may improve chronic low-back pain and disability.

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