POSTURE AND PAIN: PHYSICAL THERAPIST MANAGEMENT OF A NAVAJO RUG WEAVER

A Capstone Project for PTY 768
Presented to the Faculty of The Sage Colleges
School of Nursing and Health Sciences

In Partial Fulfillment
of the Requirements for the Degree of
Doctor of Physical Therapy

CORYLEEN B. GILBERT, PT, MS
May, 2007

Approved:

Jennifer Collins, PT, MPA, EdD
Research Advisor

Esther M. Haskvitz, PT, PhD, ATC
Program Director, Transitional Doctor of Physical Therapy Program
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POSTURE AND PAIN: PHYSICAL THERAPIST MANAGEMENT OF A NAVAJO RUG WEAVER

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Acknowledgements

No project of this size is ever undertaken without help. There are a few people that I would like to thank for their help along the way.

Thank you to the Navajo rug weavers especially Christine Curtis and Alice Dennis for their insight into the world of weaving.

Thank you to Jenny Collins, PT, MPA, EdD for reading and editing my paper. Her suggestions were thoughtful and greatly appreciated.

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Thank you to my long time friends Heidi Wells, Mrs. Leah Wells, Dee Hughes, Carol Larkin, Sue Kane, and my sister, Jo-Ellen Hanson for meeting with me whenever I came back to Troy for school. The dinners at Testos were great and laughing ourselves silly always made the stress less.

And finally, this work is dedicated to my dad, Roy J. Gilbert, for his unfailing support of my latest educational endeavor. Love you Dad.
POSTURE AND PAIN: PHYSICAL THERAPIST MANAGEMENT OF A NAVAJO RUG WEAVER

Coryleen B. Gilbert, PT, MS

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Abstract

POSTURE AND PAIN: PHYSICAL THERAPIST MANAGEMENT OF A NAVAJO
RUG WEAVER

Coryleen B. Gilbert, PT, MS

Background and Purpose. Postural deviations are frequently linked to pain, particularly
back pain. Navajo rug weavers report to physical therapy with complaints of chronic back
pain. The weaving process usually involves prolonged periods spent in one position. The
purpose of this case report is to describe the postural deviations of a particular Navajo rug
weaver that may have contributed to her chronic pain and interfered with her weaving as well
as the physical therapist management of her pain. Description. The patient was a 65-year-
old Navajo woman with a history of chronic recurring cervical and lumbar pain with left
lower extremity radiculopathy. The pain prevented her from weaving, her primary source of
income and entertainment. Hauling water and wood, which were essential for survival, also
aggravated the pain. Interventions. The patient was seen twice weekly for pain control,
core strengthening, flexibility activities, postural re-education especially for working on rug
weaving, lifting strategies, and orthotics. Outcomes. The patient was seen for 6 visits over a
4-week period. The patient met goals of pain self-management, increased core stability, and
improved posture. She also was able to weave, jog, and do chores pain free. Discussion.
Correcting the posture of this patient, especially during rug weaving and chores, eliminated
her pain believed to be related to chronic faulty posture.

Key words: Navajo rug weaving; posture and pain; core strengthening
Introduction

Posture and pain

When patients present for physical therapy with a complaint of pain, especially neck and back pain, an assessment of posture is done as part of the examination to help determine a course for their plan of care. Posture or alignment is assessed because of the belief that postural faults or malalignments could be indicative of abnormal stresses on tissues that lead to pain. These stresses could be skeletal, muscular, ligamentous, large sudden forces or small, habitual forces related to work or functional activities. Correction of postural malalignments is believed to be an important part of achieving pain relief.

Kendall et al describe ideal posture as the alignment of the body along a vertical line of reference when viewed from anterior or posterior with symmetry between body halves. When viewed laterally, the vertical line divides the body between anterior and posterior halves of equal body weight and passes through the lobe of the ear, the shoulder joint, midway through the thorax, through the bodies of the lumbar vertebrae, through the greater trochanter, anterior to the axis of the knee joint, and just anterior to the lateral malleolus. Magee further states that correct posture is the position in which minimal stress is applied to the joints and faulty posture is any position that increases stress to the joints.

Faults in posture can be attributable to sustained positions such as habit and work conditions, muscle imbalance or contracture, and pain caused by pressure on a nerve root. Faults may also be structural in nature such as a true leg length difference or spinal anomalies. With slumping during sitting, there may be increased stress and pain on one or more of the sacroiliac (SI) joints. Occupational factors which are biomechanical risk factors for low back pain according to Marras et al include work intensity (overexertion with
50 pounds or less), static work postures, frequent bending or twisting, manual materials handling (lifting, pushing, and pulling), and repetition during lifting with cycle times of less than 30 seconds. Pain seems to be greater with increased severity of postural faults.\(^7, 8, 9\)

In addition to the structural and positional causes of postural faults, there are effects that may be attributable to aging. Posterior structures in the spine (musculotendinous units, ligaments) may be affected by creep, which is the progressive deformation of a material even though the load is constant.\(^10\) Osteoporosis and osteophytes related to osteoarthritis can contribute to back pain and postural changes.\(^2, 4\)

Raines and Twomey\(^11\) conclude in their review of the literature that currently the evidence does not support a link between posture and pain. There is little evidence to quantify the effect of poor postural alignment. There have been studies by physical therapists that have attempted to quantify postural deviations\(^9, 12, 13\) rather than to use the visual observation method described by Kendall et al\(^2\) and Magee\(^3\) and used by most clinicians.\(^9\) Only the study by Harrison et al\(^12\) found a reliable and valid method but it was only for quantifying head posture. In an editorial by Sahrmann,\(^1\) she acknowledges that the evidence does not currently support a link between posture and pain, or a reliable and valid way to quantify postural deviations. However, she feels that the studies to date have been flawed and can not imagine a physical therapist assessment that did not include a postural evaluation.\(^1\)

Once postural faults have been identified, treatment decisions to correct faults and relieve pain and dysfunction are made. The treatment of postural faults that contribute to pain include stretching shortened structures,\(^2\) joint mobilizations, strengthening of stabilizing muscles,\(^4, 5, 6, 14, 15, 16, 17, 18\) and orthotics.\(^19\) Patient education topics include postural control and awareness,\(^7, 9, 20\) postural correction recommendations in static positions as well as with
lifting,\textsuperscript{14, 16} and decreasing the frequency and duration of habitual postures related to work and play.\textsuperscript{2, 3}

**The Navajo Rug Weaver**

Pueblo Indians taught rug weaving to the Navajo in the mid-17\textsuperscript{th} century.\textsuperscript{21} According to Navajo tradition and spirituality, Spider Woman gave them the ability to weave.\textsuperscript{21, 22} The Navajo raised the sheep for the wool that they would eventually turn into yarn. The sheep were herded to grazing lands and sheared with hand shears for the wool. The wool was washed, carded, dyed, and spun into yarn. The yarn was then woven into rugs. Traders encouraged them to refine their craft and helped them sell their rugs.

The looms of today still resemble the early looms (see Figure 1). The wood may be purchased in a lumbar yard but they are still handmade. The tools can also be purchased but most weavers still prefer to carve their own forks or combs. Tools are handed down in families as well.\textsuperscript{23, 24, 25}

The weaver traditionally sits on the floor or the ground in front of her loom (see Figure 1). Usually she is on her knees and sitting back on her feet. Depending upon how her loom is set up she may stay in this position and simply roll the rug under the loom as it progresses or she may get progressively higher stools as the height of the weaving goes up. If the rug is especially large she will sit in one place and then move over until each section is done.\textsuperscript{22} As the weaver ages, she may spend more time leaning in to her work because of physiological changes related to aging such as decreased visual acuity and osteoporosis, increasing her thoracic kyphosis. During weaving, the back is unsupported which may give rise to pain.
Traditionally, the weaver only spent long hours at her loom during the winter. Otherwise she had many chores related to the sheep and her household to take care of. Today, if weaving is her primary source of income, she may spend 8-10 hours per day at her loom. If weaving is a supplemental income, the weaver may be coming home from a full time job where she is sitting at a computer all day and then spend 2 to 3 hours in the evening weaving. Many weavers no longer have sheep and buy their yarn for rug making so they do not have other tasks related to their weaving that would require position changes.

Only one source mentioned physical aches and pains related to weaving. These pains included backaches, leg pains, and sore arms. These pains appear similar to other "artists", traditional crafts people, and sedentary workers such as those who work at computers that I have treated. The literature is limited to studies that discuss the link between increased sitting time and increased incidence of low back pain. In these articles, occupations that have prolonged sitting have a higher incidence of low back pain. There were no articles found that were specific to the artist population describing their static postures, pain patterns, or treatments.

Many of the Navajo patients that I treat, present with a complaint of neck and back pain. Many of these patients are women who weave rugs. They may be weaving for their full time job or the creative outlet and the possibility of extra income to support themselves and their families.

The Navajo rug weavers that I treat all report that when they weave, they sit for prolonged periods of time. Most no longer have the exercise that comes from caring for their sheep that their grandmothers had. If they are older, they have postural changes associated with aging and habit. Many would benefit from postural re-education, core
strengthening, and analysis of their weaving posture to see if adaptations could be made to allow them to pursue their weaving and other functional activities without pain. Currently, there are no published studies describing Navajo weaver posture, pain related to weaving, or suggestions for treatment of this population.

The purpose of this case report is to describe the postural deviations of a Navajo rug weaver that may contribute to her chronic pain and interfere with her weaving and the physical therapist management of her pain.

Case Description

Patient History

The patient was a 65-year-old Navajo woman who was referred for physical therapy for an exacerbation of chronic lumbar pain with radiation to the left hip and cervical and upper thoracic pain. Information about the patient was obtained through patient interview as well as through her medical record. Her past medical history was positive for osteoarthritis and degenerative joint disease of the spine per radiographic report and negative for diabetes and hypertension. Radiographic reports indicated no left hip pathology. The patient was able to speak and understand English so that an interpreter was not needed. Per the patient’s report, the pain to the left hip increased with driving, sitting, and weaving. The patient also had to haul wood and water since she lived alone in a remote area on the Navajo reservation. She used chiropractic manipulation and physical therapy interventions in the past with success. She had orthotics in the past but reported that they had worn out and she no longer had them in her shoes. She was a widow with 7 living children. She had a history of depression for which she took Elavil™. Her only other medications were Motrin™ and Flexoril™.
The patient was very concerned about being limited with her weaving because of pain. Weaving was a significant source of income as well as a satisfying creative outlet. The patient also wanted to be able to jog “a little” as this is important culturally for Navajo ceremonies. Her third need was to be able to haul wood and water with minimal discomfort.

**Examination**

Using a 10-point visual analog scale for pain, the patient reported a 2/10 level of pain at her first appointment and 4-6/10 at night, which kept her awake. She did not relate this to her position in bed but to the accumulation of her activities during the day. She reported that the pain was not constant but had some pain nearly everyday and usually worse at the end of the day. There was pain upon palpation of her left sacroiliac (SI) joint and crepitus was noted with pressure at both SI joints. She used Motrin™ 400mg for pain and reported good effect.

Using the visual observation method to assess deviations from vertical in the frontal and sagittal planes as well as deviations from the horizontal for the shoulder girdle and pelvis, the patient’s posture was assessed in standing, weaver position, and during ambulation. The patient’s height was 5 feet tall and slender build. Primary deviations in standing and walking included right shoulder lower than left and left pelvis elevated compared to the right, mild forward head, mild abdominal bulge, mild thoracic kyphosis and pes planus. The patient’s usual posture during weaving was kneeling and sitting back on her heels while leaning her trunk forward with her arms elevated to work the yarn on the loom. In this posture, her back was in good alignment but after a short while she tended to shift her weight to the left with increased pressure on the left hip and SI joints. Also there was a
tendency to lean forward increasing her cervical lordosis with the forward head posture and thoracic kyphosis while threading the yarn onto the warp yarns.

Gross range of motion screening showed extremity joints to be within normal limits. Trunk mobility was normal for flexion, extension, side bending, and rotation but spinal segmental mobilization (anterior-posterior glides) particularly of the thoracic area was stiff. The mobility was tested in prone. In the supine position, the patient had difficulty actively stretching her shoulders into full flexion. Also her shoulder girdle did not fully relax against the examination table when at rest. With her hands held behind her head, she was unable to rest her flexed elbows on the table. All indicate stiff thoracic mobility and shortened anterior chest wall musculature. The SI area had increased mobility especially on the left when pressure was applied to the sacrum in prone.

Strength was grossly normal to screening break tests for extremities but during functional activities such as rolling on table, getting up from supine to sitting to standing the patient demonstrated moderate core stability weakness for postural stabilizers, especially for the scapulas and the pelvis.

During weaving, the patient was unable to keep her pelvis aligned under her trunk and tended to shift her weight to the left side. This was the side where she complained of pain and where there was increased mobility of the left SI joint. Also, the arms are kept elevated at the shoulders while the hands are working with the yarn and tools. The patient complained of muscle fatigue around the scapular areas.

Gait was essentially normal and non-painful. But the patient complained of pain in the left SI area with jogging. She only jogged a few hundred feet. The pain was immediate during her jogging. She had orthotics in the past to control for the pes planus. They may have
also helped with the left SI pain that may have been related to a mild pelvic elevation on the left side compared to the right.

**Evaluation/Diagnosis/Plan of Care**

Based on the findings in the examination, the patient fits the preferred practice patterns 4B—Impaired Posture found in the *Guide to Physical Therapist Practice* because of her postural asymmetries and the perceived relationship to her pain. When seen for physical therapy the patient did present with localized inflammation for which she was regularly taking Motrin™ and her SI joint was tender to palpation. The patient’s complaints of pain with functional activities such as driving, weaving, hauling wood and water are related to faulty posture and core instability in the presence of degenerative joint disease and age and habit related postural changes.

Her plan of care included goals of 1) patient managed pain between 0-2/10; 2) increased core stability especially scapular musculature and pelvis stabilizers for the left SI joint; 3) lengthening of anterior chest wall musculature and mobilization of the thoracic spinal segments; 4) improved posture in standing with level pelvis and in weaving with no shifting to the left; 5) pain free function during weaving, driving, jogging, and hauling wood and water. The recommended frequency of visits was 2 times/week for a duration of 4 weeks. The *Guide to Physical Therapist Practice* puts the expected range of visits per episode of care for this practice pattern at 6-20. The interventions to be included in the plan of care were therapeutic exercise for stretching and strengthening including a home exercise program; modalities (moist heat, cold, ultrasound) as needed for relief of pain, custom fit orthotics, postural education in standing and weaving positions, patient education for safe lifting for hauling wood and water.
Intervention

The patient was seen twice weekly for a total of 6 visits over a period of 4 weeks. The sessions were usually for one hour. Modalities (cold packs, hot packs) were used as needed for pain control or to prepare tissues for stretching. The primary intervention was therapeutic exercise. The Table lists the exercises introduced at each visit for increasing the strength of the postural stabilizers, stretching tight anterior chest wall musculature, and for improving trunk flexibility particularly when holding the flexed posture associated with weaving. Figures 2-6 illustrate the exercises issued initially for the patient’s home exercise program. Orthotics were customized by me and issued on the second visit to the patient to level the patient’s pelvis by bringing her feet into a subtalar neutral rather than pes planus position. This accommodation brought immediate relief to her left SI pain. Figures 7-9 illustrate the exercises added to her program on the second visit. Figure 10 illustrates the standing, closed chain exercises added to her program at the third visit. Also, resisted hip abduction in the hooklying position, lateral step ups for hip abductor strengthening, and conditioning exercises using the recumbent bicycle and arm ergometer were added. By this visit the patient was reporting 0/10 pain with weaving and had begun to jog. No changes were made at the fourth visit and moist heat was used over the left posterior shoulder/scapular region because the patient reported muscle soreness related to increased weaving. She had a new rug on the loom and was excited to work on a new pattern. The patient was reminded to “listen to her body” and to take breaks from her work. By the fifth visit the patient was using the Shuttle Pro™ for resisted hip and knee extension and again reporting no pain with activity. Figure 11 illustrates the activity introduced for strengthening her core stability in standing while doing resisted upper extremity exercise.
Postural re-education included verbal and tactile cueing during exercise, while standing and walking, and while in her weaver posture. The patient was instructed to note when her kneeling position collapsed to the left and to stop weaving at that point for at least a brief rest. During the rest she was to stand and stretch out of her flexed posture. She was then to do the home exercise program stretches for the thoracic spine. The patient was also instructed to work at her loom for intervals no longer than 30 minutes since postural changes from sitting to standing relieve passive forces on the posterior spinal structures related to prolonged sitting.\textsuperscript{10,20}

By the sixth visit, the patient was meeting her goals and felt that she could continue on her own with her home ex program. Since she lived an hour away from the clinic, it was decided that she would continue at home independently. If she required assistance again she would contact her primary health provider.

**Outcomes**

The patient’s initial pain of 2/10 during the day and 4-6/10 at night showed improvement with each visit. The night pain was resolved within the first 2 visits with one recurrence 3 weeks later when she had spent extra time at her loom because she had been inspired to create a new pattern. The pain was gone by morning. Her day pain was well controlled by the home exercises and limiting her weaving to 30-minute sessions. When working on a weaving project, the patient reported that her usual time spent weaving was 4 to 6 hours but it could be longer if she had a deadline. Her 30 minute work intervals with at least a 5-15 minute break allowed her to keep working but prevented fatigue that would contribute to her faulty posture patterns and ultimate pain. With the orthotics the patient’s pes planus and pelvic obliquity were resolved. The patient had been able to return to jogging
pain free. She began by jogging a few hundred feet and adding a few feet each day. With each visit, the patient was able to advance her exercise program. Her functional mobility relating to core weakness during the examination improved with the patient demonstrating no difficulty rolling on the table, and getting up from supine to sitting to standing. There were no reports of pain with hauling wood or water. The patient was seen for 6 visits over a 4-week period with goals of pain self-management, increasing core stability, and improvement in posture met. A chart review 6 months later revealed that this patient had not returned to clinic for back pain since her discharge from this episode of care.

**Discussion**

For this patient, interventions related to core stabilization activities, stretching, correction of posture with orthotics and patient education, seem to have relieved her neck, back, and leg pain to allow her to manage her daily activities of weaving, jogging, driving, and hauling wood and water.

The choices for interventions for this patient were primarily related to the results of the postural assessment. Even though there are currently limited reliable and valid postural measurement tools, the commonly used visual observation method used in this case report provided the information needed to develop this patient's plan of care. After leveling her pelvis and correcting for pes planus with orthotics,\(^\text{19}\) it made sense to use therapeutic exercises to improve her thoracic mobility, trunk, and left SI joint instability. Working on the thoracic mobilization improved the scapular kinematics required for humeral elevation.\(^\text{27}\) The arms are elevated for extended periods of time during weaving. The core strengthening helped with abdominal co-activation which stabilizes the spine.\(^\text{15}\) Spinal stability is controlled by posture and results in less work of muscles when there is good alignment.\(^\text{16}\)
Patient education regarding posture, decreasing duration in the weaver posture to 30 minute sessions,\textsuperscript{2,10} and correcting technique with exercises reinforced the patient's ability to continue the plan of care on her own at home. Sullivan et al\textsuperscript{17} found that different upright sitting postures resulted in different muscle activation patterns. They studied a pain free population and concluded that specific postural training was important to improve lumbosacral and pelvic stabilization. They suggested that pain associated with altered posture in sitting may reduced with specific postural training but that specific research in that area still needed to be done. Callahan et al\textsuperscript{20} studied healthy males who had no history of back pain. One of the purposes of the study was to determine postural responses to a prolonged sitting posture. Another purpose was to assess the difference in spinal joint loading between standing and sitting postures. They found that simply standing up from the static sitting posture briefly would provide rest and relief from discomfort that developed with prolonged sitting. Positive results from changing position at prescribed intervals also reinforced this patient's compliance.

Limitations to this report may include a lack of measurable outcome in terms of quantification of postural deviations. There are limited standardized measures of posture.\textsuperscript{12,13} Although studies trying to show a valid and reliable way to measure posture have not been very successful\textsuperscript{12} and studies quantifying a relationship between posture and pain have also been mostly unsuccessful,\textsuperscript{11} physical therapists should still assess posture to assist in determining a course of intervention for our pain patients. According to Sahrmann\textsuperscript{1} perhaps the right questions have yet to be asked and researched. According to the Guide to Physical Therapist Practice,\textsuperscript{26} visual observations are part of physical therapists' tests and measures...
for assessing posture. Much of what physical therapists do is observe and then intervene based on those observations.

Another limitation is the lack of studies available that describe static postures related to artists and craftsmen in general and to the Navajo rug weaver in particular. Working on the reservation brings me into frequent contact with this population especially when they are in pain. Currently I have to use prior experience with static positioning and pain and try to apply it to these patients without direct evidence to support my choices.

Future studies on this topic could include an ergonomic study of Navajo rug weavers’ posture to define the ideal weaving posture. Comparisons could be made between weavers with pain to weavers without pain. Another study might be to identify common pain patterns among weavers. Later best interventions could be tested to treat these pain patterns. Are there particular stretching programs that would benefit weavers? Another question might be: are weavers really similar to other artists or workers (computer) who perform with prolonged fixed postures? How does postural re-education affect patients with posture related pain?

For this patient, the most important outcome measures were the resolution of her pain and meeting her functional goals of being able to weave, to jog, and to haul wood and water without pain. Using the visual analog scale for reporting pain was familiar to the patient and is used routinely in our facility for quantifying pain. With it the patient could see noticeable improvements during the episode of care. The patient was also able to report ease in functional activities. In this case, making postural corrections, stretching tight muscles, mobilizing stiff thoracic spinal segments, and improving core stability helped this Navajo rug weaver. The patient completed her plan of care happy to have met her functional goals and armed with tools to manage potential recurrences of her pain.
References


<table>
<thead>
<tr>
<th>Visit</th>
<th>Exercise</th>
<th>Amount and Frequency</th>
<th>Pain report pre- and post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; visit</td>
<td>Lying supine with thoracic towel roll and using red elastic band: Overhead, Diagonals, Arm rotation, Side pulls</td>
<td>20 repetitions of each. Also instructed to do for home exercise after weaving.</td>
<td>Pre: 2/10 (4-6/10 at night) Post: 2/10</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; visit</td>
<td>Exercise from 1&lt;sup&gt;st&lt;/sup&gt; visit plus elbow presses; bridges with ball held between knees; prone alternate arm and leg lifts Orthotics fit and issued.</td>
<td>20 repetitions for all except elbow press (10)</td>
<td>Pre: 2/10 Post: 1/10</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; visit</td>
<td>Exercises as above plus yellow band resisted hip abduction in hooklycoding; toe raises and heel raises in standing; lateral step ups; recumbent bicycle; arm ergometer</td>
<td>All exercises including elbow press to 20 reps. 10 minutes 5 minutes</td>
<td>Pre: 0/10 (patient also reports 0/10 pain with weaving and able to jog) Post: 0/10</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; visit</td>
<td>Exercises as above</td>
<td>Bicycle to 15min (1.28miles)</td>
<td>Pre: 0/10 left hip pain and back pain but complaining of 2/10 muscle soreness left posterior shoulder/scapular region. Post: shoulder pain to &lt;1/10.</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; visit</td>
<td>Exercises as above plus Shuttle Pro™ resisted hip/knee extension machine (bilateral and unilateral left and right)</td>
<td>Bicycle to 15min (1.79 miles) Bilateral—20 reps L—10 reps, R—10 reps</td>
<td>Pre: 0/10 Post: 0/10</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt; visit</td>
<td>Exercises as above plus blue band standing resisted UE flexion, abduction, and extension while holding trunk in good alignment.</td>
<td>Bicycle to 15min (2.11 miles) 10 reps with blue band</td>
<td>Pre: 0/10 (reported brief episode of night pain after extended weaving session) Post: 0/10</td>
</tr>
</tbody>
</table>
Figure 1. Traditional Navajo Rug Weaver Posture—kneeling on ground in front of loom.
Figure 2. Chin tuck exercise to help realign the head over the shoulders, strengthen the neck extensors, and stretch the neck flexors.
Figure 3. Overhead exercise with red theraband, towel roll under thoracic spinal segments to mobilize stiff segments and to stretch tight anterior chest wall musculature.
Figure 4. Diagonals with red theraband and towel roll under thoracic spinal segments.
Figure 5. Side pulls with red theraband and towel roll under thoracic spinal segments.
Figure 6. Arm rotation—external rotation with red theraband while lying over a towel roll under thoracic spinal segments.
Figure 11. Core exercise in standing. Blue theraband for resisted upper extremity exercise while maintaining good postural alignment.
November 20, 2006

Coryleen B. Gilbert
P.O. Box 1178
Ganado, AZ 86505

IRB PROPOSAL # 061-06
Reviewer: Dr. Samuel W. Hill, PhD

Dear Coryleen:

I have completed the review of your project entitled "Posture and Pain: Physical Therapist Management of a Navajo Rug Weaver" and your project has been approved. Good luck with your research.

Please refer to your IRB Proposal number whenever corresponding with us whether by mail or in person.

Please let me know if you have any questions.

Sincerely,

[Signature]

Samuel W. Hill, PhD
Chair, IRB

SWH/rd

Cc: Dr. Esther Haskvitz