Carly Viso

Kinesiology 371

Muscle Analysis Project Guidelines

Yoga: Cobra Pose

Lie face down on the floor and relax your whole body. Feel the muscles and your body relaxing all the way from the facial muscles down the shoulders, lower back, legs and then finally the feet. Let go of all your worries and tasks to do, inhale in and lift into the cobra pose. The cobra pose is a basic yoga pose that offers therapeutic and physical benefits. The pose is also a stretch for back muscles and can strengthen the spine all while putting small amounts of physical stress on the joints or muscles.

Literature review on the cobra pose provides information on the physical and mental benefits the cobra pose and yoga can have on people. The recommended joint angles for the cobra pose is to evenly distribute spinal extension in all sections of the vertebrae. Yoga Journal warns beginners to not "overdo" the backbend. While in the backbend take your hands off the floor and find a comfortable spot in extension that still provides a stretch (2). *KRI International TeacherTraining Manual Level 1* talks about how Yoga helps each the spine, organs, muscles and other parts of the body. "The movement of the sacrum circulates the spinal fluid. Stretching resets the resting tension in the muscles alongside the spine, and strengthens and re-patterns specific muscles" (Y. Bhajan 170). The cobra pose is listed as one of the

suggested movements to help the spine. “Incorporating cobra, in one's yoga practice allows for the chest to open, increases spinal flexibility and low back strength. This is a great asana for people who tend to slouch” (Landowski). Yoga in general has been proven by many studies to increase range of motion (ROM) in joints (M. Hoffman 1). The cobra pose could help increase ROM in the 3 sections of vertebrae, pelvis and hip joints. Yoga not only increases ROM in joints, but also stretches muscles and all soft tissues of the body. Yoga truly is a full body stretch.

According to *Anatomy of Hatha Yoga,* there are 3 major groups of muscles that aid in the cobra movement. The deep back muscles are the prime movers as they help the neck and shoulders and back move. The muscles of the hips and thighs, act as synergists for moderately bracing the pelvis during the extension phase (D. Coulter 285). The abdominal muscles also aid in stabilizing and the holding of the pose. They also help deepen the pose after each breath in. “When practiced correctly, nearly all poses build core strength in the deep abdominal muscles” (Hoffman 1). The *Anatomy of Hatha Yoga* book suggests different angles for different levels of experience. Beginning yoga students should try for about 30° (20° of backbending in the lumbar region and 10° of extension in the hips) or where they are comfortable. Flexible students who are experienced can probably reach about 70° and feel comfortable. Generally, the more flexible you are the higher degree of extension you achieve. People have more flexibility in their lumbar region than their hips for the back extension. Highly advanced students who are flexible can try an advanced cobra, which would require about 90° of lumbar spine extension, but for

most students spinal and hip inflexibility (along with resistant hip flexors) limit coming fully into this pose (D. Coulter 274-277).

Two common performance problems in the cobra pose are flaring the elbows out and when bending the back, the pelvis is lifted off the ground according to the video on Yoga Journal TV (Yoga Journal). When you extend the hips and vertebral column, many people flare out the elbows. When the elbows are brought out more laterally the shoulders hunch or round forward. The elbows are supposed to be kept tight against the body so the scapula (shoulder blades) can depress down the body towards the ground. The chest will then be in the correct spot to be pushed up and out towards the anterior. The second problem commonly seen is the pelvis being lifted off the ground. You want to keep the pelvis firmly pressed into the ground along with the dorsal side of your foot (Yoga Journal).

Another common performance issue is pain in the spine. *Yoga The Iyengar Way* states that a common pain from doing this pose can be found in the spine when the whole spine is not involved in the stretch. When you stretch with only certain parts of your spine and the back muscles then the weak areas will experience pain. “Where there is a pinching feeling, that part of the spine is contracted, with the intervertebral discs rubbing against each other” (S. Metha 93). To help avoid this it suggests working your way into the position and to create space in the spine by extending the vertebrae and curve it vertebrae by vertebrae. It also says to keep the coccyx and sacrum down to help with the proper extension of the spine (S. Metha 93).

The perfect model of the cobra pose according to Yoga Journal and Jodi Landowski, yoga instructor at UW-Whitewater, are combined together below. The movements should be fluid and continuous. Lie prone on the floor (belly on the ground), hips level with your weight evenly distributed throughout the whole body. Lengthen the legs and press your thighs and feet into the ground (1). "While chest is on the floor place your hands, fingers spread, middle finger coming off the center of the wrist and firmly planted, on the floor next to the chest. Move your shoulder blades down your back, bringing the shoulders away from the ears. Hugging the elbows into the body. While you slowly inhale through your nose, hands supporting and connecting to the floor, allow the sternum to lift the upper body off the floor, rib cage and chest open, low back slowly arching. Do not allow the head to 'drop' (keep ears above the shoulders)" (Landowski). Breath and movement should be synchronized. "As you slowly move into cobra you reach the extent of the inhale at the same time you reach the top of the movement or full extension of hip and spine (Landowski). Distribute the backbend evenly throughout the entire spine. "Narrow the hip points. Firm but don't harden the buttocks" (1). "Hold the pose for several slow breaths; each inhale/exhale releasing relaxes you more into the pose. When you are ready to move out of cobra, do so on a slow exhale; sternum will lower, spine will lengthen, chest falls between the hands" (Landowski). The arms and hands return to rest at a neutral position along side of the body. Every description of how to do the cobra pose is the same, just with different words and how in depth the source goes in, so I chose the 2 with the best wording. *Anatomy of Hatha Yoga*

does give examples of how to modify the pose for beginners, experienced and individuals with a physical disability though.

I would explain the cobra pose in 4 continuous phases. First step is to lie belly down on the floor, arms and hands at your side, and your top of your feet firmly on the ground. Relax your whole body and put your head in a comfortable position (i.e. lay your head to one side). Take a couple of deep slow breathes before you start to move your body. The second phase is when your ready to move, bring your arms up; bend your elbows palms on the floor (like they would be for a push up). Make sure to keep your elbows tucked in close to your body and don't let them flare out. The third phase is the back extension movement. Tighten your thighs and feet to make sure they stay touching the ground. Lengthen your legs as you do the movement. On an inhalation, push with your arms up and use your lower back muscles to extend into a back bend. Extend at the hips and all sections of your back and neck. Start at the lower back and then work your way up to your neck. Keep your pelvis into the ground and keep the weight of your body distributed evenly during the stretch. Take two or three deep slow breathes while in the stretch, allowing each breath to deepen the stretch further. Phase four is the release of the stretch back to neutral starting position. On an exhalation, release back to the starting position, starting with your lower back and working up to your neck until you are to the ground. If during the movement, you feel pain, lessen the angle of your backbend.

The Kinesiological analysis will cover the: stress on joints, different angles joints can change during the movements, muscles that are involved in the movement, and then finally the type of movement that is involved in the cobra pose. There are 2 joints that have stresses placed on when performed correctly. The first stress is felt in the spine and intervertebral joints. Since the lumbar vertebrae have the most restricted movement, it's logical that a pressure is felt there in the lower back. People will also feel pressure on their thoracic vertebrae when they push their shoulders down and away from their ears. The scapulas are depressed and medial, putting pressure on the thoracic vertebrae. Cervical vertebrae will feel pressure when you extend your head and neck posterior. There is also stress put on your hip joints. If the individual performing the cobra pose is an experienced student, then you will feel less stress or pressure on the hip joint. However, in a beginner trying to extend the hip farther than 10° will put stress on the joint. The muscles and joints are not accustomed or ready to be stretched farther than that. When the movement is done incorrectly or there are weak muscles in the posterior lower back, then there is even more stress put on the lumbar vertebral joints. People also try to ease the pain in the lower back by elevating their shoulders so there is pressure felt in the glenohumeral joint. The glenohumeral joint and the scapulas should be depressed and away from the ears.

Major joint movements include the elbow flexion, spine and hip extension, and the glenohumeral joint movement. All the movements occur through the Sagital plane and Medial/Longitudinal axis. In the very beginning the arms are placed next to the body so the elbows are flexed concentrically roughly 90°. The elbows are

supposed to be tucked into the body, so there is no movement at either of the shoulder joints. The muscles used to do this are the biceps, bicep brachia, triceps, and then the forearm muscles aiding in extending the wrist joint so the palms are flat on the ground. The glenohumeral joint does depress and move medially for proper placement of the shoulders. The deltoid muscles and triceps are weak helpers when the elbows are extended during the backbend. The abdomen and deep lower back muscles are the main lifters. The ankle joint stays in a full plantar flexion position (80°-90°) throughout the entire pose. Muscles on the more anterior lateral side of the fibula aid in ankle plantar flexion. The movement into the backbend involves the hip joint first. The hip joints extend together evenly during the cobra pose. 10°-15° is the normal full range for hip extension in beginners to intermediate. Extension in the hips past 15-20 degrees is unnatural. There are muscles that limit or resist backward bending in the hips, like the psoas, iliacus muscles, quadriceps femoris muscles, and abdomen muscles (D. Coulter 278). The major muscles and ligaments that aid in the hip extension are the erector spinae muscle group (iliocostalis, longissimus, and spinalis) (D. Coulter 279 - 280). Quadratus lumborum, iliocostalis lumborum, longissimus thoracis, and spinalis are all deep lower back muscles or posterior muscles originating and inserting on the spine that help with spine extension (L. Golding 43, 143-149). These deep back muscles help actively extend the spine and help lift one or more segments of the body against gravity. The spine extension is next and is a concentric movement as the vertebrae and muscles are compressed or shortened together. The posterior muscles act in a concentric way and the anterior muscles act in an eccentric way as they are stretched out,

especially the abdomen muscles. The abdomen muscles may experience passive insufficiency, as the active muscles in the back are unable to shorten any more because the passive anterior muscles are unable to stretch any farther. The lumbar vertebrae should be extended first as you make your way up to the cervical vertebrae. All the lower back and hip muscles are acting as resistors to gravity. The strap muscles, or splenius, aid in the last movement of neck and head extension. The head and neck are extended posterior via the C1 and C2 vertebrae. The neck is not trying to rotate to one side, so both symmetrical pairs of neck muscles would be concentrically shortening in the posterior muscles. These muscles are the resistors to the motive force gravity, pushing the head posterior. Longissimus capitis and spinalis capitis are both muscles that aid in head extension (L. Golding 145-149). When the head is extended back, the posterior spine and neck muscles act concentrically and anterior neck muscles act eccentrically as they are stretched out. The anterior muscles must fight gravity again and contract concentrically to move the head up towards the anterior neutral position. The abdomen and lower back muscles relax allowing the torso of the body to use gravity as the motive force to bring it back to the ground. To make sure you release slowly to the floor, the abdomen, hip and lower back muscles must be resisting the gravity pull. When the torso is on the ground the elbows can extend to neutral position. The body is then allowing the floor to resist gravity from pushing it any further.

The upper body and lower body work together to help perform the cobra pose correctly. The lower body (tail bone and down) is not moving and provides stability to the movement. The tightening of the thighs and feet while elongating the

legs, helps keep the hips even during a backward extension stretch to the fullest. The hips are the middle axis for the movement to occur. They allow the upper body to extend backward and keep the lower body stable to evenly stretch both sides. All the deep back, spine and abdomen muscles being used connect an upper body part with the hips or spine or vertebrae to vertebrae. The power to resist gravity and extend the back comes from the hips and the lower spine. The power comes from the middle point of the body so it helps even out the stretching.

I chose to have a girl on my floor complete the pose. She has never done yoga before and I asked her first to mimic me doing the pose and then try to do the pose after I told her what to do. Chelsea did two really good things on her own. She kept her scapula and shoulders depressed and kept her elbows from flaring laterally. The elbows and shoulder combination are normally two of the most common errors found with beginner students. However, Chelsea had difficulty keeping her pubis down on the ground and only extending with the hips and tilting the pelvis up. She tried to keep the hips down on the floor, but when she did this her shoulders elevated up and almost touched her ears. So I then instructed her for the third time while in the pose to roll her shoulders back and she managed to do the pose. The pose was somewhat challenging in trying to keep all the joints in the right direction and place. To help Chelsea make sure she can do the pose, I would suggest trying a Yoga DVD and doing it on her own. But to first take the yoga class offered here at the Williams Center, so she has an instructor telling her what to do first and then she can try to do it on her own. Repetition of this pose is the only way to get your joints and muscles to extend farther and in the correct way. I also had a girl on my staff

complete the pose. Meredith is one of the yoga instructors at the Williams center. When she did the movement it was faster and more fluid, plus she had every joint extending to the right degree and the body parts in the right spots. Her elbows did not leave her sides and her shoulders (scapulas) were pushed down away from her ears. It was a good thing to compare the new yoga student to someone who teaches it and how they positioned their bodies.

Works Cited

Bhajan, Yogi, ed. *KRI International TeacherTraining Manual Level 1*. Vol. 4. N.p.: Kundalini, 2003. 166-71. Web. 29 Nov. 2010. <http://sbss.it/pdf/TTWestern_Anatomy.pdf>.

"Cobra Pose." *Yoga Journal*. N.p., n.d. Web. 4 Oct. 2010. <http://www.yogajournal.com/poses/471>.

Coulter, H. David, and Timothy McCall M.D. *Anatomy of Hatha Yoga*. Honesdale, PA: Body and Breath Inc., 2001. 274-93. Print.

Golding Ph.D., Lawrence A., and Scott M. Golding M.S. *Fitness Professionals' Guide To Musculoskeletal Anatomy and Human Movement*. Monterey: Healthy Learning, 2003. 43-151. Print.

Landowski, Jodi. "Yoga Help." Message to the author. 2 Dec. 2010. Web. 4 Oct. 2010. <http://www.yogajournal.com/poses/471>.

"The Health Benefits of Yoga." *WebMD*. Ed. Matthew Hoffman M.D. N.p., 12 Aug. 2008. Web. 6 Nov. 2010. <http://www.webmd.com/balance/the-health-benefits-of-yoga>.

Metha, Silva, Mira Metha, and Shyam Metha. *Yoga: The Iyengar Way*. London: Alfred A. Knopf Inc, 1990. 93. Print.

Rizopoulos, Natasha, perf. *Bhujangasana (Cobra Pose)*. Narr. Natasha Rizopoulos. Joga Journal TV. Web. 2 Oct. 2010. <http://www.yogajournal.com/video/87>.