

Staying healthy to be indispensable for the long-term: A physical therapist's perspective

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Abstract

Bovine veterinarians must perform very physically challenging tasks, and often disregard simple injury prevention techniques due to such things as a lack of knowledge, prioritizing the animals over themselves, and/or not taking the time to consider options. Applying basic principles of body mechanics while performing essential duties could assist with decreasing stress on their bodies and prevent or at least delay the onset of pain or other symptoms. Additional knowledge regarding topics such as good posture, sleep positioning, and basic orthopedic care, including stretching, could improve the health of the veterinarian, allowing them to continue providing veterinary care while also being able to participate with activities outside of work as desired. A physical therapist spent significant time with a group of bovine veterinarians providing individual examinations and observing job tasks in a wide range of environments. To be indispensable for the long-term, bovine veterinarians must become more aware of HUMAN injury prevention and treatment options for themselves.

Key words: bovine veterinarian, injury care, injury prevention, bovine palpation, birthing calves

Résumé

Les vétérinaires bovins doivent faire des tâches physiques très exigeantes et ignorent souvent des techniques simples de prévention des blessures par manque de connaissance, en mettant les animaux avant eux-mêmes et/ou en ne prenant pas le temps de considérer les options. L'application de principes de base du fonctionnement du corps lors de la performance de tâches essentielles peut aider à décroître le stress sur leurs corps et prévenir ou à tout le moins retarder l'apparition de la douleur ou d'autres symptômes. Des connaissances supplémentaires sur des sujets tels que la bonne posture, la position de sommeil et les soins de base en orthopédie incluant l'étirement pourraient améliorer la santé du vétérinaire lui permettant de continuer à prodiguer des soins vétérinaires tout en l'aidant à participer à des activités en

dehors du travail selon le goût. Un physiothérapeute a passé beaucoup de temps avec un groupe de vétérinaires bovins où il a fait des examens individuels et observé les tâches liées au travail dans plusieurs milieux. Afin d'être indispensable à long terme, les vétérinaires bovins doivent devenir plus conscients de la prévention des blessures HUMAINES et des options de traitements qui leur sont accessibles.

Introduction

I grew up in Saint Henry in rural west-central Ohio. I grew up with a variety of dogs and enjoying sports of all kinds, but also regularly spent time helping friends and family with various farming activities. Eventually, I developed an interest in medicine and ultimately chose to attend The Ohio State University and pursue a degree in physical therapy. I am now an orthopedic certified specialist and the industrial rehab director for P.T. Services in west-central Ohio. I have 23 years of industrial rehab experience including transitional work programs, functional capacity evaluations, ergonomics assessments, early intervention screenings, and employer/employee educational programs. Settings for these services range from a wide variety of factories and trucking companies to medical facilities and office environments. I have also overseen development and operation of an on-site industrial physical therapy clinic.

Why Physical Therapy?

Physical therapists are considered experts in HUMAN anatomy and kinesiology while also having extensive knowledge regarding orthopedic and neurological pathology. Physical therapists can evaluate and treat a wide range of orthopedic and neurological conditions. Treatment commonly includes a combination of therapeutic exercise, manual techniques, passive modalities, gait/transfer training, and many other methods while educating patients to help facilitate faster recovery and prevent future recurrence. Physical therapists can also apply that knowledge and experience to analyze the ergonomics, body mechanics, and associated risk factors of any activity in any work setting.

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In 2000, the American Physical Therapy Association (APTA) House of Delegates provided formal direction for the profession in APTA Vision 2020. Similar to the national healthcare trend, the physical therapy profession was steered towards increasing its involvement in preventative medicine and wellness services.

Direct access for consumers is another component specifically mentioned in Vision 2020. All 50 states now allow patients to seek some level of evaluation and treatment from a licensed physical therapist without a prescription or referral from a physician. Medical insurance companies are recognizing the cost savings associated with direct access to physical therapy, which has resulted in a steadily increasing portion of insurance plans providing coverage for physical therapy services without physician referral.

Background

Veterinarians in a local practice were experiencing increasing complaints of pain and a variety of other symptoms that were causing difficulty performing and/or tolerating work tasks. The owners of the practice took a proactive attitude to benefit both the employees and the practice by contacting me to see if I could help. We discussed intervention options and decided on a multi-faceted approach.

All veterinarians in the practice were offered a physical therapy consultation conducted privately and confidentially in my outpatient clinic. Direct access allowed these evaluations to be completed without physician referral. Evaluations were scheduled for an hour and arranged around the work schedules of the veterinarians.

On-site job analysis was completed in cooperation with 1 of the veterinarians that was having some of the most difficulties. This analysis included a variety of bovine operations including a couple of smaller, family farms in Ohio and an extremely large dairy operation in Indiana, which allowed observation of a range of working conditions.

A meeting was held at the veterinary practice to review findings, observations, and recommendations. This included sharing pictures of the job analysis and discussing ideal body mechanics with each situation. I provided a home exercise program for general preventative purposes which could be used by anyone, even if they did not participate in the individual consultations.

A student from The Ohio State University was in that meeting and later asked me to present the information to a group of students who were interested in large-animal veterinary practice. As an OSU alumnus, I was honored to be invited. The students were very attentive and I had a long line of students with questions for me to answer before heading home.

The content of this special project was the starting point for the information in the remainder of this presentation. Modifications have been made and information has been supplemented based upon current evidence-based physical therapy practice.

Ergonomics and Body Mechanics

Ergonomics is fitting jobs and job demands to the capabilities and limitations of the population. The primary goal of ergonomics is to reduce the frequency of illness and injury which reduces associated costs, including monetary and quality of life. Basic ergonomics concepts include maintaining optimal sitting and standing postures as much as possible while also avoiding extreme joint positions, minimizing reaching distances, and reducing the number of repetitive tasks performed within a particular timeframe. Further discussion of this topic is not possible due to my time constraints, but it is also not vitally important because the nature of bovine veterinary practice often doesn't allow for much adaptation of the working conditions. Body mechanics awareness is therefore absolutely crucial to injury prevention.

Whether at home, in a controlled work environment or on the farm, the basic principles of body mechanics should be followed to decrease body stresses and minimize the risk of injury. You should move as close as possible to your work surface or activity to minimize reaching while performing tasks, thereby decreasing stress on the upper extremities and spine. You should also try to balance stress between both arms if possible, but it is completely understandable that some tasks such as palpation are typically completed only with your dominant arm.

Prior to performing lifting and carrying tasks, you should make sure that both the weight and size are appropriate. If you are unsure of the weight, consider opening the container to examine the contents or pushing the container to estimate its weight. When in doubt about your ability to handle an object safely and independently due to weight and/or shape, you should seek out help or separate the task into multiple lifts.

Always lift and carry objects as close to your body as possible to minimize stress on your shoulders and back. Lifting or carrying at arm's length can increase the stress on your spine by as much as 10 times compared to performing the task against your body. Heavier and more repetitive tasks should be placed between thigh and chest height if possible.

Maintaining the normal gentle spinal curves during lifting minimizes your risk of injury. Injury risk steadily increases as you increase the deviation from ideal spinal posture. To reach an object down low that you intend to lift, you should bend at your knees and hips instead of your spine. Tightening your core muscles by pulling your navel up and in helps support your spine to assist in maintaining the natural curves and decreasing the risk of injury.

You must look down as you are grasping an object you are intending to handle; however, most people make the mistake of continuing to look down while lifting. After securing your grip on the load, you should bring your head up to a level position and look straight ahead prior to lifting. It is also important to breathe out while lifting to prevent the abrupt blood pressure elevation and related heart stress caused by holding your breath in a Valsalva maneuver.

Turning while holding an object is often done incorrectly by twisting the spine. This causes shear forces on the intervertebral disc, which has been shown to increase the risk of suffering a back injury. Repetitive shear forces gradually break down the annulus fibrosis portion of the disc and eventually will result in herniation of the nucleus pulposus. Spinal curves can be maintained and rotation can be avoided by taking steps instead of twisting.

All of these concepts were considered as I completed my assessments of the physical tasks involved in bovine palpation and calving.

Bovine Palpation

This task was the primary concern expressed by the veterinarians. Palpation inherently has a risk of significant injury caused directly by the animals. There is also risk associated with the repetitive motion and forces necessary to complete the task on a herd of animals. Ideally, you should try to maintain a position as close as possible with a line between your shoulders almost perpendicular to the bovine spine. To minimize stress on the shoulder joint used for palpation and a wide variety of adjacent structures, you should minimize elevation of the arm and keep the scapula depressed and retracted while also avoiding rotation away from the inserted arm. Insertion force should be applied by stepping or lunging forward, not reaching.

Free stalls pose the biggest danger due to the lack of bovine control. Stepping up onto an available platform decreases shoulder elevation so there is less stress on the shoulder joint and other nearby structures; however, there is an increased risk due to being up on the step. Stepping down onto the floor surface provides a safer standing position, but it requires increased shoulder elevation and reaching which increases shoulder stress.

Lockups provide more bovine control, but there is still risk of lateral movement so you must be ready to move to help prevent sprain, strain or more serious injury.

Rails provide even better bovine control as well as an opportunity for an ideal insertion position; however, it could cause significantly greater stress if you do not set up this scenario properly. If you have oriented the herd properly and your shoulders are perpendicular to the bovine's spine, your palpation arm should be slightly closer to the rails and the herd. If your body is perpendicular to the rail and you are reaching away from the midline to reach the bovine for palpation, you do not have an ideal setup so you will be palpating in a position that will cause significantly more stress on the upper extremity as well as the spine. Therefore, it is very important to think through these body mechanics prior to lining up the animals in the rails so the ideal scenario is created whenever possible to minimize stress on the body.

Using an assistant to mark the herd prevents prolonged static use of the non-palpating hand for holding the paint stick.

Birthing Calves

Another task in bovine veterinary practice that poses significant risk for injury is birthing calves. The work environment may or may not be modifiable depending upon the farm, the cow or heifer, or the urgency of the situation. If the situation is modifiable, your height compared to the height of the animal should be a factor in your decision-making. Consider using a gate, bales or other items to help you get "taller" and therefore closer to the animal.

There are several tasks that warrant some education regarding risk factors, considerations and/or recommendations. First, you all know that grip and other hand strength is very important. You have more grip strength with your elbow in a bent position, which goes along with the concept of getting as close as possible to your work. Minimizing grip with the elbow extended also prevents premature fatigue while decreasing stress on the elbow, thereby lessening the risk of tendonitis.

Pulling directly on the calf, on the chains or on the handle of a calving jack can involve a large amount of force and therefore should be done with caution. First, you should get as close as possible to anything you are pushing or pulling. Keep your elbows close to your body and try to lock in your arm position. A wide, staggered stance with your legs provides you with good stability and allows you to use the power of your legs, which is more efficient and safe than relying on your arms. When there is an option, such as with use of a calving jack, you should push rather than pull. You should absolutely avoid any type of jerking motion or trunk flexion due to the significantly increased injury risk. Be sure to engage your core while you are applying your push or pull force.

Pay attention to the duration of your efforts. You may need to consider alternate interventions such as fetotomy or C-section before you or the animal are completely exhausted.

Driving

I know that some veterinarians can spend a good portion of their day driving. If you are in a good posture while driving, this can serve as a recovery period; however, if you are in a poor posture, it will only continue with stresses which are similar to those experienced while working with the animals. Prior to entering the vehicle and after exiting the vehicle, you should strongly consider stretching of some type.

The most common mistakes with driving posture are caused by poor seat position, such as the seat pan being too far away from the steering wheel and/or the backrest being reclined too far. Each of these mistakes adds to the distance between you and the steering wheel which requires more reaching, and therefore more elbow extension and shoulder protraction/rounding, along with a likely accompanying forward head position which adds stress to the neck as well.

Try a seat position that is both closer and more upright, but be sure the legs are still in a comfortable position. You

could also consider periodically making small adjustments to your seat position during your workday, which will change your body position and the related stresses.

Individual Physical Therapy Consultations

Each veterinarian completed a patient history questionnaire. A subjective examination was performed with the patient describing all symptoms including location, quality, intensity, and duration. Relieving and aggravating factors were also discussed.

It was also very important to ask the right questions to obtain a complete understanding of the related functional difficulties and limitations, both at work and at home, including sleep. This enhanced my ability to help the individual, but also provided some insight into the work environment and specific concerns of the veterinarians prior to doing any direct observation of work tasks.

The objective portion of the examinations included posture assessment, range of motion testing, strength testing, joint mobility assessment, palpation, and tests of provocation.

At the end of the consultation, each veterinarian was educated in the evaluation findings, proper posture, sleep positioning, heat/cold/cream use, and activity recommendations specific for their situation. Individualized home exercise programs were instructed and handouts were provided to assist with follow-through. Follow-up appointments were completed as needed.

Common Conditions Suspected Among the Veterinarians

Provocation tests performed during individual physical therapy consultations are intended to stress specific tissues in an attempt to reproduce and/or relieve the symptoms described by the patient. These tests alone are not sufficient for medical diagnosis, but are typically able to identify high suspicion for certain conditions based upon the test performed and the response of the person being examined. Tests for cervical radiculopathy, thoracic outlet syndrome, shoulder impingement, elbow tendonitis, ulnar neuritis, and carpal tunnel syndrome were regularly positive during the individual examinations.

Cervical Degeneration

Loss of intervertebral disc height and/or arthritic changes can result in a smaller opening for spinal nerves. Nerve impingement may occur which could cause neck pain, muscle tightness, headaches, and/or radicular symptoms. Radicular symptoms can include pain, numbness and/or tingling in the scapula, shoulder, and/or the remainder of the upper extremity.

Thoracic Outlet Syndrome

This condition could involve a wide range of presenting

symptoms and therefore is commonly overlooked or misdiagnosed. Compression of the brachial plexus with or without vascular disturbance can occur within the scalene muscles in the neck, due to pectoralis minor tightness or because of a cervical or elevated first rib. Symptoms can involve any portion or all of the upper extremity including pain, numbness, tingling, muscle weakness, premature muscle fatigue, and/or muscle cramping.

Shoulder Impingement

Poor posture, posterior shoulder capsule tightness, and pectoralis minor tightness are common contributors to decreased space for the rotator cuff. The human body can often tolerate this situation for a prolonged period, even with repetitive arm use and progressively worse posture as we get older. Eventually, this can lead to rotator cuff tendonitis and eventually could even cause a rotator cuff tear. **Provocation** can be done with the patient raising the arm forward and up as far as possible, then someone applying additional pressure in the same direction or the patient placing a hand on top of the opposite shoulder; then someone lifting the elbow above shoulder height. Sharp pinching or pain in front of or on top of the shoulder with either test indicates suspicion for shoulder impingement.

Elbow Tendonitis

The origin of the muscles involved in the use of the wrist and hand are concentrated in the small areas of the common flexor and extensor tendons at the epicondyles of the elbow. This stress is worsened when these forces are applied with the elbow closer to a fully extended position, which is 1 of the reasons we always advocate for getting as close to your work as possible. Lateral epicondylitis is much more common and is known as tennis elbow while medial epicondylitis is known as golfer's elbow. **Provocation** for lateral epicondylitis should be done with the elbow fully extended. If symptoms are more severe, it may only require someone passively bending the wrist fully into flexion. If symptoms are less severe, the person being examined should fully extend the wrist and then attempt to hold that position while someone else attempts to bend the wrist. Lateral elbow pain during either test would indicate suspicion for lateral epicondylitis.

Ulnar Neuritis

Prolonged or repetitive elbow flexion, repetitive gripping, and/or long durations of direct pressure can cause inflammation of the ulnar nerve. This inflammation could cause pain, numbness, and/or tingling into the 4th or 5th digits of the hand. **Provocation** can be done by someone tapping the ulnar nerve at the elbow, and a positive result is tingling into the 4th or 5th digits. The ulnar nerve is located just posterior and lateral to the medial epicondyle in the ulnar groove. **Basic intervention** to control ulnar nerve symptoms involves preventing prolonged elbow flexion greater than 90 degrees while sleeping. This can be done by gently holding a pillow or

spouse. In extreme cases, you could purchase a brace/splint or place a rolled towel in the crease of the elbow, and hold it in place with an elastic wrap.

Carpal Tunnel Syndrome

Inflammation can cause compression of the median nerve as it passes under the transverse carpal ligament in the anterior wrist. The most common cause is repetitive use of the finger flexors for gripping, and the most common first symptom is waking up regularly with your hands numb and/or tingling. Pregnancy increases incidence due to fluid retention, and can even occur if there is no repetitive use. **Provocation** is done by placing the backs of the hands together in front of you with the forearms horizontal. Apply a steady pressure between the hands for up to 30 seconds while monitoring for numbness and/or tingling into the 1st, 2nd, or 3rd digits of either hand. **Basic intervention** is regular cold pack use immediately after work or other repetitive activity, as well as just prior to going to bed. Also, splinting of the wrists while sleeping prevents the natural tendency to maintain a flexed wrist position that restricts space in the carpal tunnel. With a neutral wrist position, you maintain better circulation and more space for structures in the carpal tunnel, thereby improving recovery from daily stresses and decreasing your risk for carpal tunnel syndrome. Some patients are able to limit the use of splints to only those nights after heavier upper extremity use during the day. If you have an episode of waking up with hands tingling, assume a prayer position and symptoms are likely to quickly resolve.

Patient Education Topics

Posture

Proper posture can assist in preventing fatigue and controlling symptoms by positioning joints for ideal weight distribution and optimal biomechanics, which minimizes the risk of injury. Poor posture can predispose an individual to conditions such as sprain/strain, tendonitis, bursitis, neuritis, and degeneration of the joints or spinal discs. This can include a wide range of symptoms and related functional limitations.

Assessment of posture can be done by having someone else observe you from the side or someone else could take a picture that you can then examine yourself. Common misalignments include a forward head, rounded shoulders, increased thoracic kyphosis, increased lumbar lordosis, and knee hyperextension. Initially requiring cognitive thought, awareness, and correction of abnormal posture can be difficult and frustrating, but typically it becomes easier over time. The goal is for proper posture to become your “normal” without any cognitive thought needed.

Proper standing posture should be maintained as much as possible during static standing, walking, and all related activities. An imaginary vertical line should connect the earlobe, shoulder, hip, knee, and ankle. Proper spinal alignment includes gradual inward curves (lordosis) in the neck and

lower back and a gradual outward curve (kyphosis) in the middle back. Proper sitting posture has the same head, torso/spine, and hip alignment while the knees should be bent no more than 90 degrees. The feet should be flat on the floor or another object. Core muscles should be engaged throughout the day in both sitting and standing to help maintain good posture and prevent injury.

With the shoulder in its proper position, a forward head will present with the earlobe in an anterior position compared to the shoulder. To achieve proper alignment, you can perform a “chin tuck” by keeping your eyes level while pulling your head back. Initially, this can be a difficult movement to achieve, and it may cause mild stretching in the back of the neck.

Rounded shoulders are often accompanied by an increased thoracic kyphosis. While observing from the side, the shoulder should be pointed directly to the side and the scapulae should be close to a vertical position; however, it is very common for the scapula to be protracted, causing the shoulder to be directed forward while the superior portion of the scapulae are also tipped anteriorly. This can be corrected by pulling the shoulder blades back and down at a comfortable intensity. Overcorrection is likely to be uncomfortable and may cause a change in lower back alignment.

Excessive lumbar lordosis can be caused by protruding abdominal weight, a lack of core muscle engagement, anterior hip muscle tightness, and/or knee hyperextension. To correct this abnormal spinal alignment, start by making sure your knees are not in a hyperextended or “locked out” position, which can make core muscle engagement difficult. The knees should be “soft” or slightly bent, which decreases knee stress while also making core engagement easier. To engage the core and decrease the inward curve of the lower back, use the abdominal and buttock muscles together to pull the navel up and in to a comfort position called “pelvic neutral”. Avoid trying too hard which could cause a strain, excessive flattening of the lumbar curve, and/or quick fatigue.

Medial Foot Arches

Proper arch position, whether obtained through natural structure or maintained by appropriate footwear, is important for the good lower extremity alignment necessary to minimize lower extremity stress and fatigue, which decreases the risk of injury.

To assess your arches, you must be in a standing position with your shoes and socks off. There are a wide range of assessment techniques, from simple observation to the very common “wet test” that is advocated by many shoe manufacturers to the navicular drop measurement which is performed by some physical therapists.

“Flat feet”, or pes planus, is a very common problem that can contribute to a wide range of problems from the foot to the lower back. If you have pes planus, a very simple preventative measure that can be taken is the purchase of proper footwear and/or inserts. Stability tennis shoes provide the

additional support needed to maintain a neutral arch position and better lower extremity alignment during standing and walking activities. Stability tennis shoe options can often be identified by consulting a manufacturer's website. Selection of a person's ideal stability shoe is based upon individual comfort due to such things as differences in support, cushioning, heel width, toe box width, and lacing systems.

Increased support can also be achieved by using a custom or over-the-counter insert. Custom inserts can cost up to \$800 and often are difficult to get approved by insurance. Luckily, you can usually avoid custom inserts unless you have other problems, such as a foot deformity or diabetes. Over-the-counter inserts typically cost \$35 to \$75, but should be selected carefully because many fail to provide the level of support needed. I recommend removing the insert from the box, placing it on a hard surface, and pushing down on the arch area of the insert with the heel of your hand. Consider how it would support your body weight over the course of a day. Patients commonly ask about the foot assessment kiosks and inserts available in large retail stores. In my opinion, these inserts are not adequate for someone with pes planus.

For people with pes planus, it is very common to need the additional support of an insert inside of a boot used for work due to the lack of support contained in the structure of the boot. I also often recommend people with pes planus avoid or minimize the use of traditional sandals; however, there are several manufacturers that now offer options for sandals that have stability contained within their structure which has made my patients very happy.

"High arches" or pes cavus is much less common and less likely to cause similar problems. If you have pes cavus, your anatomy is providing adequate support so neutral shoes which are typically lighter and more flexible are more popular. Inserts for boots are typically not necessary.

A quality shoe store, often associated with running, typically has knowledgeable staff that can assist with arch evaluation and make recommendations from a wide range of shoes and inserts. They also give you the opportunity to try on multiple different options prior to making a choice instead of taking a guess while shopping online. I regularly recommend a locally-owned running shoe store to my patients. Their shoes are not just for runners, and you could just use the store as a resource for quality boot inserts. Bring your boots with you!

Sleep Positioning

Good duration and quality of sleep is incredibly important for your health. Recommendations are for 7 to 9 hours of sleep per night for adults, and the internet provides a wide range of interventions to improve the quality of sleep. Many medical professionals feel sleep is just as important as eating healthy and exercising. Studies have shown that better sleep can significantly improve speed, accuracy, reaction time, mental well-being, and immune system function while also lowering the inflammation levels that contribute to orthopedic conditions.

Supporting joints in a neutral position while resting decreases joint stress, improves circulation, and promotes muscle relaxation for improved body comfort. This should help you fall asleep faster and stay asleep longer to allow optimal recovery from the physical and mental stresses of your day. Optimal positioning should also make it more likely for you to wake up in the morning and feel ready to go without any initial pain or stiffness.

My patients commonly ask me to make a recommendation regarding a mattress. First, most people keep their mattresses well beyond the recommended 8 to 10 years. I don't endorse a specific manufacturer, but I do advise that a common mistake is a mattress that is too soft. If a patient comments about preferring a softer mattress, I ask them to consider a pillow-top mattress which provides a firm mattress with a softer pad on top. Another option for a softer mattress is a bed with adjustable firmness. The mattress industry has changed significantly in the past 5 years with quite a few manufacturers shipping directly to your home and offering free trial periods with free return shipping. This provides consumers with an alternative to typical retail settings and I commonly recommend my patients consider this option.

I educate my patients regarding some basic rules of sleep positioning. First, sleeping on your stomach should be the last option considered for sleeping, primarily due to the stress placed on your neck. Second, your elbows should be kept below the level of your shoulders to decrease the stress on your shoulders. Putting your hands under your pillow is typically not a problem. If you sleep on your side, you should first try the side opposite any painful shoulder, lower back, or hip.

Neck pain is a common patient complaint that hinders good sleep and/or causes difficulty upon waking. Patients sometimes mention rolling up their pillow, but this support is not dense enough and typically does not stay in place. Contour pillows for the neck can be expensive and are typically not adjustable. How can 1 size of neck roll be the ideal thickness for both a petite woman and a broad-shouldered man? It can't! Therefore, I advocate using a towel roll placed inside the lower portion of the pillowcase of your top pillow. The thickness of this towel roll can be adjusted for an ideal fit to the stature of the individual and there is no associated cost. Typically, this same towel roll can be used whether laying on your back or your side. If you decide to try this towel roll, you may also need to make changes to the number and/or thickness of the pillow(s) being used at your head.

Many patients tell me that they are unable to sleep on their back (supine), but are unable to identify the reason. While sleeping on your back with your legs out straight, the weight of your legs pulls down on your pelvis and causes increased pressure in your hips and lower back. I feel this is 1 common reason that people avoid sleeping supine. Bending the knees and supporting the weight of your legs will decrease this pressure. Patients commonly mention using pillows under the knees; however, pillows typically do not

work well because they are too soft and often do not stay in position. I recommend making a tight blanket roll that is wider than your knees to prevent your legs from falling off. The height is also important because it needs to be high enough to relieve the pressure, but you need to avoid making the roll so big that your heels are unable to rest on the bed. You should also consider using 1 unfolded thin pillow under each arm to lift your elbows off the bed and prevent your hands from resting on your stomach.

While sleeping on your side, most people only use pillows at their head. I recommend also using a thin pillow under your top arm to lift your arm off your side. You should also use 1 thick or 2 thin pillows between your knees and ankles, which decreases stress on your lower back and hips. A common mistake is to put this support only between your knees which does relieve some stress, but fails to achieve optimal positioning. The amount of bend in your knees is based upon personal preference.

Laying on your stomach (prone) is not recommended, but it may be the only position that works for some people. While laying on their stomach, people commonly turn their head the same direction when trying to fall asleep. This causes significantly greater stress to 1 side of the neck. Therefore, I recommend using 1 thin or no pillow under your head and alternating which direction you rotate your head while falling asleep in the prone position. The prone position also tends to cause an increase in the lumbar lordosis and therefore increased pressure in the joints of the lower back. You can alleviate this increased pressure by placing a pillow at your waistline that is thicker than what you use at your head.

Ideal Resting or Recovery Position

Research studies have measured lumbar disc pressures in various body positions, such as proper postures, improper postures, and various resting positions. Higher lumbar disc pressures are caused by slouching in sitting and lifting improperly. The lowest pressure is in what I have labeled the "90-90" position while others have used the terms static back position or constructive rest position. This position involves lying flat on your back with your hips and knees bent to 90 degrees, which places your thighs vertically and your lower legs horizontally. A common way to assume this position is to lay on the floor with your lower legs supported on either the couch or an ottoman. This has been most effective for my patients to relieve pain or pressure after prolonged standing, prolonged sitting or an extended duration of heavy activity. A duration of 20 to 30 minutes has been effective and some choose to simultaneously use a moist heating pad during this time. Be sure to avoid falling asleep in this position due to circulation concerns and the potential for a temporary loss of sensation.

Injury Recognition

Muscle fatigue and general soreness should be expected when starting new work tasks, changing work processes or

increasing work pace or duration. New aches or pains may also occur intermittently for no apparent reason. If symptoms occur, initiate treatment immediately and perform it consistently to try to resolve the problem. Strongly consider seeking medical attention if your initial symptoms impact your functional ability, symptoms steadily worsen despite basic injury care, or there is no improvement with 2 weeks of basic injury care.

Basic Orthopedic Care

Simple first steps include increased awareness of posture, body mechanics, and sleep positioning. It may also be helpful to modify your work schedule, such as changing work assignments to provide variety throughout your day, avoiding problematic work on consecutive days or temporarily eliminating problematic tasks.

A well-known guideline for treatment of a new injury is Rest, Ice, Compression, and Elevation (RICE), which has been advocated for a long time but there is limited evidence of its effectiveness. Another option is Protection, Optimal Loading, Ice, Compression, and Elevation (POLICE). This is a newer line of thought that tries to avoid excessive rest, which can delay your return to normal mobility and activity. Optimal Loading refers to choosing an appropriate lighter activity level and progressing steadily based upon symptoms and common sense. A physical therapist can be a valuable resource to help guide a gradual return to your prior functional level, especially if surgery or a period of immobilization was necessary to treat the injury or condition.

Stretching could be included as another component of basic orthopedic care. It absolutely should be pain-free. Typically, you should start with shorter hold times, less repetitions, and lower intensities. Progression can be made with caution as appropriate and tolerated.

Cold Application

Cold should be used exclusively for the first 72 hours after your initial injury or onset of symptoms. You may continue to use cold packs beyond the 72-hour mark if you feel it is still helpful.

Cold can be applied using a commercial cold pack, bags of frozen vegetables (recommend peas or corn), ice in a plastic bag, or a cold pack made using an online recipe. You must have clothing, a towel, or another type of material between your skin and the ice to prevent frostbite. Of course, a thinner material, such as a pillowcase, provides a colder sensation.

Cold application should be limited to a maximum of 20 minutes per hour to prevent frostbite. The remaining 40 minutes of the hour allows the skin to return to a normal temperature prior to reapplying.

Heat Application

Moist heat provides deeper penetration than dry heat.

Methods of applying moist heat include hot showers, hot baths, hot tubs or heating pads. Electric heating pads are preferred over microwaveable versions because the user has the choice of several intensity levels and a steady heat is maintained for the entire duration of application. Older electric heating pads should not be made wet due to the risk of being shocked. Newer electric heating pads are constructed differently which eliminates the risk of shock, and they have a sponge that is made wet then placed inside the outer cover to provide the moisture.

Heat is an appropriate option when at least 72 hours have transpired since the initial injury or symptoms. Use should be limited to a maximum of 30 minutes per hour to prevent excessive fatigue caused by prolonged heat dissipation and to allow the skin to return to a normal temperature prior to reapplying.

Cream Application

A wide variety of pain-relieving creams are available to assist with symptom control. You should not apply heat within 3 hours of applying a pain-relieving cream because the heat may cause a reaction with the cream which could result in skin lesions. Therefore, I typically recommend using creams when going to bed to assist with sleep and/or when leaving home to improve tolerance to activities such as work, running errands, or a prolonged ride in a vehicle.

Stretching

Benefits of stretching include decreasing tension in tight muscles, improving circulation, and making it easier to assume better posture. Tightness and related abnormal postures cause increased stress on muscles, tendons, and nerves. Therefore, stretching helps prevent injuries and conditions that can occur during such things as home activities, work tasks, and exercise.

Research shows benefits for both dynamic and static stretching. I have found that a dynamic warm-up followed by static stretching is effective as a pre-work program with my various clients. The dynamic warm-up increases blood flow and warms up tissues prior to performing the static stretching. Dynamic warm-up should start relatively slowly within a small range of motion, and then gradually increase in speed and range within individual tolerances. Be careful to avoid any discomfort or loss of balance. Examples of dynamic warm-up include squatting combined with an overhead reach, backwards arm circles, leg swings, and back rotation.

Static stretching should be held for a minimum of 15 seconds to improve flexibility, but up to 30 seconds is relatively common. Typically, each stretch is completed several times within a session, but a single stretch is better than none. Rest time is necessary between stretches, so typically I recommend alternating sides with the same stretch or alternating between 2 different stretches on the same side. You should always stop when you reach a strong, comfortable stretch, and hold that position without bouncing or trying to

go any further. The motto of “No pain, No gain” should never be applied to stretching.

To aggressively attempt to gain flexibility, I recommend completing 3 to 5 repetitions of each stretch for 15 to 30 seconds at least twice a day, and maintaining this frequency for several weeks. To maintain flexibility gains, I typically advocate completion at least 3 times per week.

Posture Reversal

Continuously performing similar tasks is much harder on the body than alternating between tasks which stress the body differently. For example, alternating between palpation and other types of exams or treatment allows for a change in posture and related body stress. Fatiguing muscles and stressed joints have time to rest while the alternate task is being performed, which should decrease the risk of injury.

Posture reversal, assuming an opposite posture, can assist in tissue recovery and facilitate a return to a better posture prior to resuming the same work or an alternate task. These posture reversal techniques can be the same as common stretches, but they do not need to be held for 15 seconds. Some people find it more helpful to do several shorter repetitions with only a brief pause between repetitions. These techniques could be done while walking to a different area on a farm, while talking to a contact person or while waiting for an animal or supplies.

Sustained or repetitive arm use in front of the body is a very common working position, and therefore many people can benefit from a brief break for a posture reversal that could be done seated or standing. A chest and biceps stretch is done by interlocking your fingers behind your back and lifting your hands as high as possible. Keep your torso upright and shoulders down.

Another option for postural reversal to counteract repetitive arm use would be a chest stretch combined with a nerve glide. To perform this, point your arms at a downward angle towards the floor with your palms facing forward. Pull the shoulders back and down, then draw the arms back as far as comfortably possible. Gently pump your hands back and forth up to 20 times, but be sure to avoid causing any numbness or tingling in your hands.

I also advocate backward bending for posture reversal to counteract sustained or repetitive trunk flexion. This is done in standing with your hands on your hips. One hand may be placed on a stationary object if there is a balance concern. Lean your torso backwards, but avoid any pinching or pain in the lower back. Again, this position could be held for 15 seconds, but you may find it more helpful to perform multiple repetitions of shorter duration.

Basic Preventative, Treatment and Posture Reversal Exercises

Remember, stretches should be held for 15 to 30 seconds each. Then you should alternate with another stretch or take a

30-second break between stretches. If performing for posture reversal purposes, shorter hold times are sufficient and only a few seconds between repetitions is common. The most commonly used posture reversal techniques were discussed earlier in this presentation.

Pectoral Stretching

I advocate using a doorway for this stretching for better control, but some people prefer to use a corner. A staggered stance allows better control of stretch intensity and you should rest your arms down at your sides between repetitions. To stretch pectoralis major, the elbows should be slightly below shoulder level or lower before gently lunging forward to create a stretch in front of the chest and shoulders. You can choose the arm angle(s) which provide you with the best stretch sensation. The pectoralis major stretch can improve posture and could be used as a posture reversal technique.

To stretch pectoralis minor, raise the arms at an angle overhead with the elbows straight. When looked at from the back, the person performing the stretch looks like a capital "Y". Lunge forward gently to create a different stretch in front of the shoulders. The pectoralis minor stretch is important for good posture, especially to address thoracic outlet and impingement syndromes.

Chest/Biceps Stretch

In a seated or standing position, interlock your fingers behind your back with your palms together. Keep your shoulders down as you squeeze the shoulder blades together. Keep an upright posture and maintain your shoulder position while you raise your hands up as far as possible. This stretch can be used to help with maintaining good posture which helps prevent impingement syndrome.

Posterior Capsule Stretch

Keep your right shoulder down while you use the left arm to pull the right arm across your chest to produce a stretch on the back of the shoulder. If a pinch or pain occurs in front or on top of the right shoulder, then the stretch should be done at a lower height. This stretch is usually done by alternating sides and is vital to the prevention and treatment of impingement syndrome.

Inferior Shoulder Glide with Upper Trapezius Stretch

While seated, grasp the edge of your chair and lean your torso gently away while tipping your head in the same direction you are leaning. This stretch is often done by alternating sides. This stretch can help relieve neck tightness and address impingement syndrome concerns. It could also be used as a posture reversal after prolonged arm use.

Median Nerve Glide

While seated or standing, point your arms at a downward angle towards the floor with your palms facing forward.

Pull the shoulders back and down then draw the arms back as far as comfortably possible. Gently pump your hands back and forth up to 20 times, but be sure to avoid causing any numbness or tingling in your hands. This can be used as a posture reversal technique, and it can help with prevention or treatment of carpal tunnel syndrome.

Elbow Stretch

To stretch the right elbow, keep the right elbow straight with the palm down and use the left hand to push down on the back of the right hand. If this is ineffective, try keeping your right elbow straight, but rotate your right arm inward so your fingers are pointing outward prior to pushing down with your left hand. This can be used as a posture reversal for sustained or repetitive gripping or other hand use.

Finger Stretch

Spread your hands open as far as possible and place the tips of your fingers together in front of your chest with your thumbs pointed down. Push your fingers and thumbs towards each other as far as possible while keeping your palms apart. This can be used as a hand stretch for posture reversal after prolonged use. It can also assist in the prevention and/or recovery from muscle fatigue, muscle soreness, muscle cramping, and trigger fingers.

Healthy Lifestyle

Living a healthier lifestyle can be used as a preventative measure or as a component of treating a current problem. Common examples include achieving an ideal body weight, stopping smoking, performing regular aerobic exercise, participating in some type of resistance training, and limiting or quitting caffeine and alcohol use.

Food for thought...research shows that your hips, knees, and ankles bear 3 to 5 times your total body weight while you are walking. For every pound you are overweight, you are adding 3 to 5 lb (1.4 to 2.3 kg) of extra weight during each and every step. If you lost 10 lb (4.5 kg), it would be the equivalent of subtracting 30 to 50 lb (14 to 23 kg) of weight from every step. Consider how many steps you take in a typical day and how this weight loss could significantly lessen joint stresses, thereby slowing down degenerative changes.

Supplementation of a healthy diet could also be considered, but should be done in consultation with your family practitioner and/or your pharmacist. Vitamin B supplementation has been shown to improve nerve health but you must be careful to avoid excessive intake due to side effects. Fish oil and turmeric have been promoted as having an anti-inflammatory effect which can help with joint pain and stiffness, including symptoms caused by arthritis; however, it is crucial that you consult a pharmacist or physician if you are taking other anti-inflammatories, blood thinners, or other heart medications due to potential dangers.

Perspective on Practicing Veterinarians

Unfortunately, none of us can do anything about the way we practiced in the past. We certainly can intervene now to slow down and potentially reverse some of the effects of the physical demands of veterinary practice. Some of you would argue that you didn't know about ergonomics or body mechanics. Now you know the basics, some specifics, and can apply this information to other situations.

Some of you would argue that you didn't know what exercise would be beneficial. Now you have options to address a wide range of common orthopedic problems, and I hope this will motivate you to also find information to intervene with other problems as needed.

Some of you would argue that you didn't know that your symptoms were a problem or how to treat it. That information has been shared so now you need to put it to use.

Some of you would argue that you don't have the time. It takes little or no additional time to perform tasks in a different manner for decreased body stress or to complete posture reversal techniques that will assist in recovery. Exercise for prevention or treatment can often be incorporated into your day such as while eating a meal, reading emails or talking on the phone. Use of cold or heat could be done while driving during your workday or in the evening while watching television, sitting at a computer, or interacting with your family.

Take action NOW so that you can be healthy enough to be indispensable for the long-term in your veterinary practice! Your overall quality of life will also be improved because you will be able to keep your ability to participate with your family, hobbies, and social activities, to name a few.

Perspective on Current Students

The AABP had the foresight to provide you information to help you prevent orthopedic problems related to your future veterinary practice.

Start practicing veterinary medicine with a conscious effort to consider ergonomics and body mechanics with everything you do. This should facilitate development of a good

habit so that it eventually becomes second nature to consider the stress on your body while approaching each work task and other activities throughout your day.

Posture reversal should be started immediately so this prevention technique becomes second nature as well.

If you choose to take time for a preventative stretching program, I would recommend a minimum of 5 repetitions of each exercise with a frequency of at least 3 times per week. Additional time can be spent as problems arise and time allows.

This mindset could prevent or at least delay any breakdown of your body. You have the opportunity to avoid or minimize pain, numbness, tingling, and any associated functional limitations. Start NOW!

Future Physical Therapy Options

I appreciate the opportunity to present to your organization to assist with education, injury prevention and basic intervention techniques. I am willing to serve as a resource for a wide range of potential future needs...

- Additional Large Education Venues
- Problem-solving for Ergonomics and Body Mechanics with Work Scenarios
- Employee Education
- More Extensive General Stretching Programs
- Introductory General Strengthening Programs
- Individualized Stretching and/or Strengthening Programs

I would also encourage you to strongly consider consulting a physical therapist near you to address any current or future concerns. Physical therapy is evidence-based and focuses on patient education to assist with resolution of your current problem and long-term maintenance to try to prevent any recurrence.

Feel free to contact me by email at sjuhlenhake@icloud.com or suhlenhake@ptsrehab.com. You are also welcome to contact me on my cell phone @ 419-733-4736.



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IMPORTANT SAFETY INFORMATION FOR CYSTORELIN: Do not use in humans. Keep this and all drugs out of the reach of children.

IMPORTANT SAFETY INFORMATION FOR SYNCHSURE: FOR ANIMAL USE ONLY, NOT FOR HUMAN USE. KEEP OUT OF REACH OF CHILDREN. Women of child-bearing age, asthmatics, and persons with bronchial and other respiratory problems should exercise extreme caution when handling this product. In the early stages women may be unaware of their pregnancies. SYNCHSURE is readily absorbed through the skin and may cause abortion and/or bronchospasms: direct contact with the skin should therefore be avoided. Accidental spillage on the skin should be washed off immediately with soap and water.



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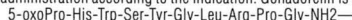
For treatment of cystic ovaries in dairy cattle

For use with cloprostenol sodium to synchronize estrous cycles to allow for fixed time artificial insemination (FTAI) in lactating dairy cows and beef cows.

CAUTION: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION:

CYSTORELIN® is a sterile solution containing 43 mcg/mL of gonadorelin (GnRH) as 50 mcg/mL gonadorelin diacetate tetrahydrate suitable for intramuscular or intravenous administration according to the indication. Gonadorelin is a decapeptide composed of the sequence of amino acids—



a molecular weight of 1182.32 and empirical formula $C_{55}H_{75}N_{17}O_{13}$. The diacetate tetrahydrate ester has a molecular weight of 1374.48 and empirical formula $C_{59}H_{81}N_{17}O_{15}$.

Each mL of CYSTORELIN contains:

Gonadorelin diacetate tetrahydrate (equivalent to 43 mcg gonadorelin)	50 mcg
Benzyl Alcohol	9 mg
Sodium Chloride	7.47 mg
Water for Injection	q.s.
pH adjusted with potassium phosphate (monobasic and dibasic).	

Gonadorelin is the hypothalamic releasing factor responsible for the release of gonadotropins (e.g., luteinizing hormone [LH], follicle stimulating hormone [FSH]) from the anterior pituitary. Synthetic gonadorelin is physiologically and chemically identical to the endogenous bovine hypothalamic releasing factor.

INDICATIONS FOR USE:

Cystic Ovaries

CYSTORELIN is indicated for the treatment of ovarian follicular cysts in dairy cattle. Ovarian cysts are non-ovulated follicles with incomplete luteinization which result in nymphomania or irregular estrus. Historically, cystic ovaries have responded to an exogenous source of LH such as human chorionic gonadotrophin. CYSTORELIN initiates release of endogenous LH to cause ovulation and luteinization.

Reproductive Synchrony

CYSTORELIN is indicated for use with cloprostenol sodium to synchronize estrous cycles to allow for fixed time artificial insemination (FTAI) in lactating dairy cows and beef cows.

DOSE AND ADMINISTRATION:

Cystic Ovaries

The intravenous or intramuscular dosage of CYSTORELIN is 100 mcg gonadorelin diacetate tetrahydrate (2 mL) per cow.

Reproductive Synchrony

The intramuscular dosage of CYSTORELIN is 100 mcg gonadorelin diacetate tetrahydrate (2 mL) per cow, used in reproductive synchrony programs similar to the following:

1. Administer the first CYSTORELIN injection (2 mL) at Time 0.
2. Administer 500 mcg cloprostenol (as cloprostenol sodium) by intramuscular injection 6 to 8 days after the first CYSTORELIN injection.
3. Administer the second CYSTORELIN injection (2 mL) 30 to 72 hours after the cloprostenol sodium injection.
4. Perform FTAI 0 to 24 hours after the second CYSTORELIN injection, or inseminate cows on detected estrus using standard herd practices.

WARNINGS AND PRECAUTIONS:

Not for use in humans.

Keep out of reach of children.

WITHDRAWAL PERIODS:

No withdrawal period or milk discard time is required when used according to the labeling.

The Safety Data Sheet (SDS) contains more detailed occupational safety information. To obtain a SDS or for technical assistance, contact Merial at 1-888-637-4251. To report suspected adverse drug experiences, contact Merial at 1-888-637-4251. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS, or <http://www.fda.gov/AnimalVeterinary>.

PHARMACOLOGY AND TOXICOLOGY:

Endogenous gonadorelin is synthesized and/or released from the hypothalamus during various stages of the bovine estrus cycle following appropriate neuro-genic stimuli. It passes via the hypophyseal portal vessels, to the anterior pituitary to effect the release of gonadotropins (e.g., LH, FSH). Synthetic gonadorelin administered intravenously or intramuscularly also causes the release of endogenous LH or FSH from the anterior pituitary.

Gonadorelin diacetate tetrahydrate has been shown to be safe. The LD50 for mice and rats is greater than 60 mcg/kg, and for dogs, greater than 600 mcg/kg, respectively. No adverse effects were noted among rats or dogs administered 120 mcg/kg/day or 72 mcg/kg/day intravenously for 15 days.

It had no adverse effects on heart rate, blood pressure, or EKG to unanesthetized dogs at 60 mcg/kg. In anesthetized dogs it did not produce depression of myocardial or system hemodynamics or adversely affect coronary oxygen supply or myocardial oxygen requirements.

The intravenous administration of 60 mcg/kg/day of gonadorelin diacetate tetrahydrate to pregnant rats and rabbits during organogenesis did not cause embryotoxic or teratogenic effects. Further, CYSTORELIN did not cause irritation at the site of intramuscular administration in dogs with a dose of 72 mcg/kg/day administered for seven (7) days.

TARGET ANIMAL SAFETY:

In addition to the animal safety information presented in the PHARMACOLOGY AND TOXICOLOGY section, the safety of CYSTORELIN was established through the review and evaluation of the extensive published literature available for the use of gonadorelin-containing products.

The intramuscular administration of 1000 mcg gonadorelin diacetate tetrahydrate on five (5) consecutive days to normally cycling dairy cattle had no effect on hematology or clinical chemistries.

In field studies evaluating the effectiveness of CYSTORELIN for the treatment of ovarian follicular cysts, the incidence of health abnormalities was not significantly greater in cows administered CYSTORELIN than cows administered a placebo injection.

The target animal safety of, and injection site reactions to, gonadorelin when used with cloprostenol sodium were evaluated during the conduct of effectiveness field studies. The incidence of health abnormalities was not significantly greater in cows administered gonadorelin than cows administered a placebo injection.

EFFECTIVENESS:

The use of CYSTORELIN for treatment of ovarian follicular cysts in dairy cattle was demonstrated to be effective with a treatment dose of 100 mcg gonadorelin diacetate tetrahydrate.

The effectiveness of gonadorelin for use with cloprostenol sodium to synchronize estrous cycles to allow for FTAI in lactating dairy cows was demonstrated in a field study at 10 different locations in the U.S. Four of the locations represented conditions that would typically cause heat stress in lactating cows. A total of 1607 healthy, non-pregnant, primiparous or multiparous lactating dairy cows within 40-150 days postpartum were enrolled in the study. A total of 805 cows were administered gonadorelin (1 mL; 100 mcg gonadorelin as the acetate salt) and 802 cows were administered an equivalent volume of water for injection as an intramuscular injection twice in the following regimen:

Day 0: 100mcg gonadorelin (as the acetate salt) or sterile water for injection

Day 7: 500 mcg cloprostenol (as cloprostenol sodium)

Day 9: 100mcg gonadorelin (as the acetate salt) or sterile water for injection

Fixed time AI was performed on Day 10, approximately 11 - 31 hours after the Day 9 injection. Cows were evaluated for pregnancy on Day 45 ± 5 days by trans-rectal ultrasound or rectal palpation. Pregnancy rate to FTAI was significantly higher ($P < 0.0001$) in cows treated with gonadorelin (33.4%) than the pregnancy rate to FTAI in cows treated with water (13.6%). The environmental condition (heat stress or not heat stress) did not affect the conclusion of effectiveness. The effectiveness of gonadorelin for use with cloprostenol sodium to synchronize estrous cycles to allow for FTAI in beef cows was demonstrated in a field study at 10 different locations in the U.S. A total of 706 healthy, non-pregnant, primiparous or multiparous beef cows within 40-150 days postpartum were enrolled in the study. A total of 364 cows were administered gonadorelin (1 mL; 100 mcg gonadorelin as the acetate salt) and 342 cows were administered an equivalent volume of water for injection as an intramuscular injection twice in the following regimen:

Day 0: 100mcg gonadorelin (as the acetate salt) or sterile water for injection

Day 7: 500 mcg cloprostenol (as cloprostenol sodium)

Day 9: 100mcg gonadorelin (as the acetate salt) or sterile water for injection

Fixed time AI was performed immediately after the Day 9 injection. Cows were evaluated for pregnancy on Day 55 ± 5 days by trans-rectal ultrasound. Pregnancy rate to FTAI was significantly higher ($P = 0.0006$) in cows treated with gonadorelin (21.7%) than the pregnancy rate to FTAI in cows treated with water (7.4%).

The effectiveness of a 2-mL dose of CYSTORELIN delivering 100 mcg gonadorelin diacetate tetrahydrate (86 mcg gonadorelin) for use with cloprostenol sodium to synchronize estrous cycles to allow for FTAI in lactating dairy cows and beef cows was also demonstrated through references to scientific literature.

HOW SUPPLIED:

CYSTORELIN is available in a concentration of 50 mcg/mL gonadorelin diacetate tetrahydrate (43 mcg/mL gonadorelin) pH adjusted with potassium phosphate (monobasic and dibasic).

CYSTORELIN is supplied in multi-dose vials containing 10 mL and 30 mL of sterile solution.

STORAGE, HANDLING, AND DISPOSAL: Store at or below 77°F (25°C). Brief excursions to 86°F (30°C) are permitted. Use within 6 months of first puncture.

NADA 098-379, Approved by FDA

Marketed by:

Merial, Inc.

Duluth, GA 30096-4640 U.S.A.

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SYNCHSURE™

(cloprostenol sodium)

By Merial

Prostaglandin Analogue for Cattle
Equivalent to 250 mcg cloprostenol/mL

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION:

SYNCHSURE (cloprostenol sodium) is a synthetic prostaglandin analogue related to prostaglandin $F_{2\alpha}$. SYNCHSURE is indicated for intramuscular use at a two mL dose to induce luteolysis in beef and dairy cattle. The luteolytic action of SYNCHSURE can be used to manipulate the estrous cycle to better fit certain management practices, to terminate pregnancies resulting from mismatings, and to treat certain conditions associated with prolonged luteal function.

USES OF SYNCHSURE:

Unobserved or Nondetected Estrus: If a mature *corpus luteum* is present, SYNCHSURE can be used to induce estrus. Estrus is expected to occur 2 to 5 days following injection. Treated cattle should be inseminated at the usual time following detected estrus or twice at 72 and 96 hours post injection if estrus detection is not possible or desirable.

Pyometra or Chronic Endometritis: Endometritis is inflammation of the uterus and pyometra is characterized by the lack of cyclical estrus behavior and the presence of a persistent *corpus luteum*. SYNCHSURE induces luteolysis which usually results in evacuation of the uterus and a return to normal cycling activity within 14 days after treatment.

Mummified fetus: Induction of luteolysis with SYNCHSURE usually results in the expulsion of the mummified fetus from the uterus. (Manual assistance may be necessary to remove the fetus from the vagina). Normal cyclical activity usually follows.

Luteal Cysts: Luteal cysts may cause abnormal cycling patterns in cows. Treatment with SYNCHSURE can restore normal ovarian activity by causing regression of the luteal cyst.

Pregnancies from mismating: SYNCHSURE can be used to terminate unwanted pregnancies in cattle from 1 week after mating until about 5 months of gestation. The induced abortion is normally uncomplicated and the fetus and placenta are usually expelled 4 to 5 days after the injection. The efficacy of SYNCHSURE in inducing abortion decreases after 5 months of gestation, while the risk of dystocia and additional consequences increases.

Controlled Breeding: SYNCHSURE can be used to schedule estrus and ovulation for individual animals or a group of animals to control breeding times. SYNCHSURE can be used in controlled breeding programs through either single or double injection protocols. Only animals with a mature *corpus luteum* should be treated with the single injection protocol to obtain a maximum response to the single injection. Prior to treatment, cattle should be examined rectally and found to be anatomically normal and nonpregnant. Before a controlled breeding program is planned, the producer and his consulting veterinarian should review the operation's breeding history, herd health and nutritional status and agree that a controlled breeding program is practical in that particular situation.

The use information provided here is not comprehensive. Talk to your veterinarian and consult the full prescribing information available at www.synchsure.com for further details on uses of SYNCHSURE.

SAFETY AND TOXICITY: AT 50 and 100 times the recommended dose, mild side effects may be detected in some cattle including increased uneasiness, slight frothing, and milk let-down. The risk information provided here is not comprehensive. To learn more, talk to your veterinarian about SYNCHSURE or call 1-888-637-4251. The full prescribing information can be found at www.synchsure.com.

CONTRAINDICATIONS: SYNCHSURE should not be given to pregnant animals whose calf is not meant to be aborted.

WARNINGS: For animal use only. Do not use in humans. Keep out of reach of Children. Women of childbearing age, asthmatics and persons with respiratory problems should exercise extreme caution with handling this product. In early stages, women may not be aware of their pregnancies. SYNCHSURE is readily absorbed through the skin and may cause abortion and/or bronchospasms: direct contact with the skin should be avoided. Accidental spillage on the skin should be washed off immediately with soap and water.

PRECAUTIONS:

Careful aseptic techniques should be employed to decrease the possibility of post-injection bacterial infection. Antibiotic therapy should be employed at the first sign of infection. The Safety Data Sheet (SDS) contains more detailed occupational safety information. For technical assistance, to request an SDS, or to report a suspected adverse event, contact Merial Technical Support at 1-888-637-4251. For additional information about adverse event reporting for animal drugs, contact FDA at 1-888-FDA-VETS, or <http://www.fda.gov/AnimalVeterinary>.

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