Physical and mental preparedness for large animal practice

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Abstract

Veterinary medicine, specifically large animal practice, is a highly physical job with inherent physical danger. Being in good physical shape and cultivating good fitness habits can decrease our risk of injury. Physical fitness will affect our performance. For example, measurements of grip strength have been shown to be indicative of accuracy in transrectal bovine palpation pregnancy diagnosis at the student level. This session also covers acute and chronic stress and tools we can use to complete stress cycles.

Key words: grip strength, habits, stress, stress management

Introduction

I am a wife, mother and large animal veterinarian by trade. I am also a member of Team Canada Powerlifting and have competed at the Pan American Powerlifting Championships (winning weight class and overall best lifter), Commonwealth Powerlifting Championships (winning my weight class), and twice at the International Powerlifting Federation Open Classic World Championships where I placed 7th and 6th respectively. I probably take physical preparedness to the extreme. I have also experienced struggles related to mental health such as decreased capacity for compassion, anxiety and burn out. Therapy has greatly helped me. Here I will outline one of the biggest factors for recognizing and managing stress that I have learned from my therapy sessions.

To begin

We carry with us 2 tools as a veterinarian: our brain and our body. We have spent the better part of a decade training our brain for veterinary practice – learning the ins and outs of disease processes, treatment options, surgical skills and prognostic indicators. Veterinary medicine, particularly large animal practice, is also a physically demanding job. Many aspects of the profession require physical competence, such as the strength and dexterity required in bovine transrectal palpation for pregnancy diagnosis, stamina to conduct complete post mortem examinations, and strength to lift calves during Cesarean sections. Ideally, veterinarians are not routinely put into compromising positions that can cause injury to themselves in their working environments, and practicing good postural habits will decrease the likelihood of chronic/overuse injury and contribute to long-term success.

About our injuries

A 2018 survey of western Canadian veterinarians reported a prevalence of musculoskeletal discomfort in the past 12 months at 89.5%, and within the lifetime at 96.9%.[1]

Musculoskeletal discomfort in large animal veterinarians is a topic of interest, with a majority of the discomfort relating to the upper body (shoulder and neck ~60% respectively), and lower back (~63%) being common locations. Veterinarians self-report that palpation is the second most physically demanding part of the job (just behind obstetrical procedures and in front of bull semen collection) and contributes to musculoskeletal discomfort.[1] Elevated lifting postures, awkward positions and repetitive movements (hello, rectal palpation) contribute to development of disease.

The shoulder

A study by Reist et al. in western Canada evaluated time spent palpating, arm angles during palpation, and estimated the force of entry into the rectum. Arm angles > 60° and > 90° were considered extreme postures. For our purpose, we will speak on arm angles. In the study, 7 veterinarians participated and all of them experienced arm angles > 60°. On all beef examinations, the veterinarian was expected to perform tasks not related to palpation (operating gates/levers) that put the arm into as much as a 150° angle. Hydraulic chutes reduced the strain on the body when they were present. The use of ultrasound didn't significantly change the ergonomics of pregnancy diagnosis.

Movement of the arm > 90° must incorporate external rotation to avoid contact/rubbing of the rotator cuff tendons under the acromion. Poor posture generally induces internal rotation of the shoulders. Taller vets have fewer shoulder problems than shorter ones (consider the angle of entry for palpations). People who smoke or have diabetes are at higher risk due to decreased vascularization in the tendons.

While ideal conditions are rarely present, we can take some steps to manage our habits so that we are more resilient in the work place. Using a stool, milk crate, hay bale or otherwise palpating from an elevated platform, reduces shoulder angle. Even a simple habit such as not reaching into the back seat to grab things will decrease your risk of injury.

Exercises to help increase shoulder strength and stability are front delt raises (at 45° angle), banded shoulder external rotations, and Y-T-W-A.

Exercises such as bench dips and external rotation of the shoulder cause more strain (on the biceps tendon and subacromial bursa respectively) than building strength and endurance in the shoulder muscles.

The neck

Regarding the neck, proper posture is head and ears above the shoulder. We tend to lean forward and round the shoulders which puts a lot of strain on the back of the neck and the upper shoulder area. This posture is referred to as "text neck" and

occurs when we stay in the same position from extended periods of time. Neck pain also leads to referred pain into shoulders, elbows, hands, etc., by causing pinched nerve roots. It is important to stabilize and strengthen the neck. This referred pain can be prevented by focusing on proper posture and changing body position regularly to avoid "creep". Isometric neck strengthening exercises such as chin tucks, prone cobra, as well as the dynamic wall angels are beneficial.[3] The best part? These exercises can be done at home!

The spine

Now the lumbar spine. Eighty-five percent of people have experienced lower back pain at some point in their life, most of which is non-specific.[4] Veterinary work has many risk factors for lower back pain, including prolonged seated positions, low spinal extensor endurance, and repeated bending. Genetics and being significantly overweight also contribute to lower back pain. Injuries to the spine are most likely to occur when the load is away from the body, too heavy, or the lumbar spine is not neutral (slight lordosis is normal). Prevention would be to extend the lumbar spine after driving, having lumbar support in the truck/when seated, back strengthening exercises like bird-dogs, planks, superman holds and glute bridges.

Grip strength

What about something as simple as grip strength? Several studies have been conducted on the use of grip strength as a biomarker for healthy aging. Grip strength is measured on a dynameter with the arm at 90°, and grip force is applied for a total of 3 squeezes – grip strength is the average of the 3 readings.[5] Low grip strength is associated with an accelerated methylation process at the cellular level, which leads to higher risk of age-related conditions including poor nutritional status, type 2 diabetes, heart disease, cancer, dementia, Alzheimer's, depression, functional disability, osteoporosis and increased all-cause mortality.[6-9] Interestingly, grip strength was recorded for all Swedish army recruits (men) for WWII as part of their physical examination. That's over 1 million participants. The cohort study found that men with the weakest grip strength in their late teens were 20% more likely to die by their mid-50s[10] than men with a stronger grip strength in their late teens.

Putting it all together

What does this have to do with being a food animal veterinarian and getting better at the job? Accurate pregnancy diagnosis of cattle is a necessary skill for large animal veterinarians, including new graduates. With limited training opportunities for live animal palpation, other opportunities for increasing diagnostic accuracy outside of this are being pursued. Dr. Annandale has conducted several studies evaluating factors that influence diagnostic accuracy in veterinary students.[11,12] Students found it most difficult to identify open cows, somewhat easier to find early pregnancies, and the least difficult was to identify last-trimester pregnancies. Annandale used EMG studies to identify what muscles were activated during palpation in an effort to help develop an effective grip strength exercise routine.[12] In her research, she found that improving grip strength via participation in an exercise program significantly improved pregnancy diagnosis accuracy. Students with a grip strength of > 30 kg demonstrated higher specificity (ability to identify open cows).[11]

How to get better grip strength? Exercise. I am a big fan of resistance training, especially with a barbell, but not everyone is able to start there nor want to be there. Resistance training, whether it's weights like a barbell or dumbbell, or even use of resistance bands, carries many benefits physically and mentally. It has been shown that as little as 30-60 minutes of resistance training per week carries a 15% reduction in all-cause mortality.[13] Any exercise, not just grip-specific exercise, will increase grip strength. However, if you're looking for grip-strength-specific exercises, hand grip strengtheners are a good truck-side tool that you can squeeze while driving, or a farmer's carry, where you just carry around an increasingly heavier load in each hand. The load can be quite light to start – think grocery bag, gallon of milk, etc. A good benchmark for the farmer's carry for a male is to be able to carry your body weight (half in each hand) for 2 minutes; for women it is 75% of body weight divided over each hand.[14]

The grip-specific exercise program includes finger and hand contraction and extension exercises as well as exercises targeting the forearms, shoulders, back and core. There are 3 levels of difficulty, and these do require a few pieces of equipment such as an egg-shaped finger exerciser, hand web and resistance bands. It is suggested that a grip strength specific exercise program be incorporated into veterinary school curricula to increase transrectal palpation diagnosis accuracy. I will link the specific grip strength exercise program that Dr. Annandale discusses here **http://icarus.up.ac.za/vetmlp/**.[11,12]

Interestingly enough, students undergoing the 6-week exercise program self-reported other benefits of the exercise program. In addition to feeling more comfortable during palpation sessions and being able to palpate longer before becoming fatigued, students reported having fun, relaxation and stress relief.

Speaking of stress

The NIH defines stress as the physical or mental response to an external cause that can be either positive or negative.[15] Everyone will experience stress at some point, whether it's good or bad. Knowing how stress works in the body, and how to complete stress cycles, can help you cope.

Impacts of stress on the body

There are 3 stages of the stress cycle: alarm, resistance and exhaustion.[16]

In acute stress or the alarm stage, fight, flight or freeze is activated. Signals from the amygdala to the hypothalamus to the adrenal glands release epinephrine and cortisol that increase heart rate, increase immune function, and increase muscle tone.

The resistance stage occurs once the stressful event passes. When there is a perception of safety the body returns to normal. Lack of safety leads to experiencing poor concentration, irritability and frustration.

In chronic stress or the exhaustion phase, the body doesn't return to normal baseline and we experience other symptoms related to the previously mentioned changes. Impacts throughout the body can be identified.

Central nervous system/endocrine system effects include increased adrenaline and cortisol. Mental affects include sleep dysregulation, anxiety, depression, fatigue and burnout.

The respiratory system will have an increased respiratory rate as well as dilated airways to allow more oxygen to the get to the brain, but this will worsen conditions such as asthma, emphysema and bronchitis.

In the gastrointestinal tract, stomach discomfort (bloat, pain, nausea), diarrhea, IBS +/- gastric ulcers, as well as an increase in glucose levels, occur.

This is especially important for people with type 2 diabetes, because glucose control is more difficult.

For the cardiovascular system, increased heart rate over a long term puts more stress on the heart, which increases the risk of chronic high blood pressure, heart attack and stroke.

Persistent tension of the skeletal muscles will lead to headaches, migraines, as well as neck and limb pain.

Reproductively, people experience increased PMS symptoms, heavier or irregular periods, heightened symptoms of menopause, increased difficulty becoming or maintaining pregnancy, decreased testosterone, and an impact on semen production including symptoms such as impotence, erectile dysfunction and infections of the prostate or testes.

Chronic stress weakens the immune system, making it harder to recover after getting sick or injured and easier to contract viral infections.[13]

There are 7 ways to complete the stress cycle, so there is no one-size-fits-all approach and you may find that you're already doing some of these without realizing why.[16]

- Physical activity – being active can help keep your body safe in a fight, flight or freeze situation. USDHHS recommends at least 150-300 minutes of moderate intensity physical activity per week.[17] Physical activity is also important to maintain our bodies for longevity in the job.
- Creativity – drawing, painting, sewing, gardening, redecorating your living space, baking, cooking or knitting.
- Laughing, as in full belly laughs, not light chuckles.
- Crying – crying is a physical release of stress from the body and is an excellent way to just "let go".
- Physical affection – if physical comfort helps you feel safe, this can be beneficial. A 20-second hug is the minimum time needed to release oxytocin and works if you're hugging yourself, another person or even a pet? Other forms of physical affection include self-massage and small hand circles on your chest.
- Deep breathing with a strategy like the box breathing method (4 second inhale, 4 second hold, 4 second exhale, 4 second hold) is effective in reducing stress. Similarly, breath-focused exercises programs like tai chi and yoga combine breathing with flowing movements to increase calmness. A breathing method that I have liked is the Wim Hof method which is 30 rhythmic breaths followed by a max effort hold on the last exhale, 15 second hold inhale, then repeat the process for a total of 3-5 rounds. There is no one-size-fits-all so it's worth trying several styles to find a good fit.
- Rest – sleep is essential to restoring body function. It is recommended to get 7-9 hours of sleep per night. Time away from stress is important - take your vacation days!

Other resources that can help build strength or reduce stress

- Improving your general physical preparedness such as Before The Barbell (**https://www.strongstrongfriends.com/before-the-barbell/**) and Street Parking (**https://streetparking.com/**)
- Mental health support can come in a variety of forms. Professional mental health expert such as a social worker, psychiatrist, or psychotherapist are excellent and with the option of virtual meetings, these can be done in the privacy of your own home. Support groups such as the one offered by AABP every other Wednesday! (**http://aabp.org/committees/mental_health/Support_Group.asp**).
- There are also a number of valuable breathing/meditation apps such as Calm, Insight timer, KORU and Wim Hof.

Conclusion

The physical demands of veterinary practice are inevitable. Chronic exposure to stress without an effective outlet can set you up for broader health implication as time goes on. Incorporation of physical strengthening exercises and stress relief tactics into daily life reduces your risk of experiencing compassion fatigue, burnout and physical ailments that would negatively impact your ability to do your job and thrive as a human. Take care of yourselves out there.

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