Chiropractic and Functional neurology

 The young dog

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This article is the first in a series of three. Here I will concentrate on the puppy and very young dog. The second article will deal with the performance dog, while the third article will focus on the ageing dog.

Too many dogs are compensating for a reduced or impaired function in a single or several areas of the top line. This causes pain and over the course of time, it may lead to a variety of ailments in relation to the nervous system, the immune system or possibly a specific organ disease.

If chiropractic treatment is applied early in a dog’s life, there is a greater chance of preventing the development of a variety of chronic conditions, such as back pain or lameness. Dog owners frequently experience, that a prized well-bred puppy suddenly exhibits impaired motor performance, such as various forms of lameness or even a change in behavior.

## In some of the less complicated cases, ex. where the dog becomes acutely lame on one leg, the Veterinarian can easily diagnose and pinpoint the pain to a specific joint, which then can be treated in the traditional fashion. In the growing individual the veterinarian may diagnose possible congenital and hereditary bone disorders, for example osteochondrosis.

However, we are not always aware, that a trauma may be more extensive, than what meets the eye. The trauma may involve other parts of the body as well. Once the acute pain has resolved, the dog will be in the process of compensating. This means, that we may have treated the symptom, but not necessarily the actual cause or simultaneous dysfunction, which lies behind the symptom. It is important to maintain a focus on the entire dog instead of just on the most obvious symptoms.

**The Veterinarian**

It can be quite Confusing for a dog owner, to know how to deal with, a young dog with lameness, other pain related symptoms or simply a different behavior its littermates. Consulting a veterinarian when in doubt, cannot be empathized enough. Many illnesses will worsen drastically, if proper treatment is not applied early in the course. At this day and age, it is commonplace for veterinarians to specialize in a variety of areas, which brings the veterinary field to a high professional level. It is thus of great importance, that specialized veterinarians are able to cooperate in a fashion, which optimizes the resulting treatment of our dogs.

With each consultation one must assess the body structure in relation to posture and motor system. Does the development of muscle mass correlate to breed type, age and activity level of the dog? For example, even if the dog comes to the veterinary clinic with gastro/intestinal symptoms, it is important to include in the evaluation, whether this is a dog, which otherwise appears to be well functioning both in the motor system which is in the musculoskeletal apparatus but also mentally. It is all interconnected; the sooner you become aware of a dysfunction and its underlying cause, the greater the chance you have, at successfully treating it. Early prevention is of paramount importance for the mood of the dog, for his performance, quality of life – and is finally cost saving for the owner.

**Anatomy and physiology**

As our knowledge of developmental biology increases, the growing insight into our biological makeup and its development will inevitably captivate: Imagine, from the merging of the first two cells, the process takes approximately 63 days, for the fully formed vital puppy fetus to be ready for birth. It is also amazing that in a mere 9 weeks, a brain, a body and an extremely complicated communication system is fully formed. When the unborn dog fetus is just 3 weeks old, the brain and the nervous system is already formed. The development continues with the forming of blood vessels, bones, joints and inner organs.

When the puppy is born, its skeleton consists of so-called primary bones. The bones have so called primary ossification centers (growthplates). As an example, the pelvis is formed by three bones on either side, which are fully ossified by the time the dog is approximately 6 months old. Remaining are still the so called secondary ossification centers, which in the pelvis would be the point of the hip and the socket of the hip joint, which will have completed ossification by the time the dog is between 1 and 1½ years of age.

The long bones also have ossification centers (growth plates), which are fully closed by the time the dog is about 1½ years old. It does not take a large degree of uneven wear and strain, before you will see asymmetry and consequently permanent compensation.

If a puppy has been stuck in the birth canal, or possibly been trampled on by the bitch, it may have caused a fixation in the top line i.e. the neck or the back, which prevents it from bearing an equal amount of weight on both sides of the body. The asymmetrical distribution of body weight on the limbs will significantly influence the growing bones, which are not yet fully ossified. An injury or trauma of this nature is thus of greater consequence for the young dog than for a fully grown individual.

 *“The skeleton serves for support and protection, while providing levers for muscular action. It functions as a storehouse for minerals and as a site for fat storage and blood cell formation. In the living body, the skeleton is composed of a changing actively metabolizing tissue, that may be altered in shape, size and position by mechanical or biochemical demands” (Evans “Miller`s Anatomy of the dog, third edition, p.122)*

For a puppy which is about to learn how to stand and walk, it of great importance that he is able coordinate movement and to maintain balance. Occasionally you will notice, that one or more of the puppies in a litter, seem clumsier that the rest. Some people will mistakenly choose such a puppy, thinking it is particularly cute, or appreciate that it appears quieter than the rest. At the other end of the scale, there is the overactive puppy, which deviates as much from the norm as the docile puppy and is just as likely to have physical symptoms in need of closer examination as the docile one. There is a high probability that the puppies, which deviate in behavior from the rest of the litter, are in need of treatment.

**What is the meaning of the word chiropractic?**

The word chiropractic is of Greek origin. In Greek the word “cheir” means “hand” and “practice” means to “perform”.

Chiropractic treatment is like osteopathy, physiotherapy, massage etc. It is a manual form of treatment.

The aim of the treatment is to stimulate the body / brain communication, by reestablishing the normal body control

**How does chiropractic treatment work?**

 It is not possible to “*move bones*”, you can´t “*knock them back in place*” either. In chiropractic treatment you stimulate the nervous system, or more specifically the brain, into reactivating the normal functions of the body. There are numerous specialized nerve cells known as proprioceptors = mechanoreceptors, surrounding all joints and in all the muscles which control the joints. These cells inform the brain of the position in a given joint, and of status quo regarding the functionality of the surrounding muscles. In turn the brain responds by sending a nerve impulse back to the muscles, which are supposed to move the joint. The brain is dependent on the received information, in order to maneuver the body optimally. If a joint has been immobilized or has had reduced mobility over a longer period, then the communication between body and brain will become disturbed/altered.

In chiropractic treatment we use bone as a contact point, but this is solely because all joints are formed between two bones. So by applying a controlled force in the direction of movement of the joint, which it is no longer able to perform, the chiropractic therapist will manually activate the mechano-receptors, which again stimulates the brain into re-establishing a normal function. In this process a neuromuscular reflex arch will normalize the mobility, removes tension and pain in the surrounding tissue of the injured or compensating joint. If we discover asymmetry in one or several areas of the body, it will inevitably be caused by a body, which is compensating for impaired function somewhere. An exception to this would be in case of fracture or other form of pathology, for which other form of treatment is required initially.

**Functional Neurology**

Both human and veterinary medical practitioners are frequently working like auto mechanics. If the elbow hurts, then the focus will be on examining the elbow, if the patient is limping, then the leg in question is x-rayed or scanned. Many of these clinical examinations are an attempt at diagnosing solely based on the symptom. In other words, we locate the pain and concentrate our attention to that location.

The communication between brain and body goes two ways. The brain operates and controls the body, but can only do so optimally, if it has clear and unhindered feedback from the body. In other words, every time a muscle moves, it will be sending a signal to the brain, in order to stimulate the areas in the brain, which in turn activates the body.
If the bitch accidently lies on a puppy, it may easily cause a fixation of the muscles of his back. These muscles will no longer send the same signals to the brain, as they should, which means that the corresponding area of the brain, will no longer be stimulated the right way, and consequently show a reduced activity level. The brain, in turn, is now unable to control the muscles, and the body will be further prone to trauma. This is also why puppies should not engage in play with older and larger dogs; – allowing this is the equivalent of playing Russian roulette with the youngster´s health.

A body and its nervous system is constructed to manage a wide array of situations, but only if the neurologic communication system is intact. In situations where dogs of unequal size and age engage in play, the outcome is most commonly trauma inflicted upon the puppy. The puppy does not have the strength to react as quickly as the adult, nor does he have the physical coordination. Frequently the puppy will not have the ability to react, because he is headed in a different direction. If the larger dog torpedoes him, he will most likely experience trauma resulting in an acute muscle strain. The degree of trauma is directly proportional to the force of the blow and the size difference of the dogs.

**The autonomous nervous system**

The autonomous nervous system is automatic: This system ensures, that your heart continues beating, that you will keep breathing and that your intestines continue working even during sleep. It is something which your conscious mind has no control of.

The autonomous nervous system consists of the parasympathetic and the sympathetic, which is in balance in the well-functioning individual. The parasympathetic system ensures the “*rest and the digest*” while the sympathetic is the opposite, which is the “*fight and flight*” response. When frightened, the body will react by dilating the pupils, by increasing the heart rate and tensing of the muscles in preparation for a rapid move, whether for an engagement in fight or in preparation of fleeing danger.

If an imbalance between parasympathetic and the sympathetic systems occur, it is called dysautonomia, which may have extensive consequences for personality and temperament in the puppy. Mental development is an ongoing process through the formative years of the dog. This means that a puppy may deviate from the rest of its siblings in the litter and also in relation to what is commonly perceived as normal. Dysautonomia can also cause chronic intestinal problems, immune related issues and so on.

 A puppy or an adolescent dog with an elevated sympathetic response may mistakenly be perceived as a super happy dog with lots of energy, when in reality we are seeing a stress induced condition, which the dog is unable to manage. In the long run it may cause behavioral problems, chronic gastro/intestinal problems or perhaps skin diseases or allergies. It is a condition, which cannot be treated with medicin, you can´t control it through training, and imposed rest and quiet is equally ineffective. It is a dyscommunication in the nervous system, which must be diagnosed as early as possible. With knowledge and understanding of functional neurology, the practitioner will be able to prescribe various neurological exercises, which can help rehabilitating the neurological control, unless pathological changes have already manifested themselves.

**Nutrition**

Proper nutrition is of paramount importance for the body and its neurological function. The proverb: “*you are what you eat”* doesn’t just relate to humans but also to our animals. Our nerves and muscles must have the proper nutrition in order to develop properly. It is therefore important to seek professional guidance in feeding the growing individual. This is, however, too vast a subject to cover here in its entirety; it deserves an independent article.

**Exercise**

Exercise is important – also if you have a puppy. Exercise stimulates and reinforces the neuro-muscular communication and is important for the development of coordination and balance. Exercise doesn´t just strengthen our muscles, it is highly stimulating for the cerebellum, which is the main center for coordinating all the muscles in the body. Naturally, it must be emphasized, that we are talking about light, frequent and varied exercise (which is never one sided), when dealing with the young individuals. Correct exercise will create, what neurologists’ term; “plasticity”, this means that, with every biomechanically appropriate step the individual takes, neuromuscular strength is created and reinforced, which forms a basis for the dog´s future life as an athlete.

It is important to ensure that the puppy is exposed to varied exercise, in order to develop and strengthen as many muscle groups as possible. Many dog owners are mistakenly convinced, that puppies are not allowed to run. Puppies can run and play with each other, as this is an important part of developing important social skills. When you get the puppy home, it is better to encourage less but suitable exercise, rather than a lot of stupid exercise, such as chasing sticks and balls or play with older and larger dogs.

In my practice I see many litters of puppies at the age of 8 weeks. About ¾ of the puppies will already at this time have developed various problems in their neck and back. It is tough to enter the World and to be squished and tumbled, so with this in mind, it is not surprising to see the significant number of juvenile dogs with chronic lameness and back issues.

**Conclusions**

The body is the master at compensating, so often we will be looking at the symptoms, while there is actually an underlying cause in a completely different part of the body. With this in mind, it is not surprising that, many patients repeatedly return to the clinic with new or recurring symptoms. Sadly, the offered treatment will usually be a repetition of what was performed earlier.

If a little puppy has pulled a muscle in the loin, the biomechanics of the body will compensate, and with time the brain/ body communication will begin to perceive the condition as normal, and the dog will develop a counterproductive movement pattern, which gradually will lead to other symptoms and problems. Basically, it is not just of interest to discover, if the body has an acute lumbar fixation, it is of greater importance to uncover, if the brain/body communication has gone astray. For the proper diagnosis, you will have to perform a functional neurological examination.

In the event that the neurological deviations are discovered to have pathological causes, you will have to refer the juvenile patient to image diagnostics, as there are rare events where you can find developmental anomalies.

The earlier the intervention, the greater the chance we have, of getting a well-functioning dog with quality of life, and a dog which will give his outmost performance, when we work with him