

Importance of ergonomics in dentistry work



Poor ergonomics, particularly in relation to veterinary dentistry, not only negatively impacts our physical health but can, in the long-run, affect our mental wellbeing and overall health too, writes Ingela Ericsson VN

Veterinary dentistry is an often-overlooked area in ergonomic thinking and the prevention of work-related injuries. The pitfalls are many, from maintaining awkward posture for prolonged periods of time to inadequate lighting, work area or equipment. And the consequences of exposure to poor ergonomics at work are many too, from back injuries, hand, elbow, shoulder and neck pain to headaches and eyesight strain

IDENTIFYING THE RISKS

What is ergonomics and what role does it have in veterinary dentistry, you might ask? Ergonomics focuses on how the human body and mind function in response to the equipment and technology we use on a daily basis in the workplace. The following can pose potential risks to vets carrying out dentistry:

- Lifting heavy patients above waist height;
- Standing or sitting for long periods of time in awkward postures;
- Pinch-grasp force while using hand and power instruments;
- Vibrating ultrasonic instrumentation;
- Repetitive motions;
- Awkward manoeuvres to reach equipment and instruments;
- Inability to adjust patient to operator;
- Inability to sit with neutral spinal position;
- Lengthy procedure times; and
- Poor lighting and magnification.

In order to solve the ergonomic issues relating to veterinary dentistry, it is important to identify the risks and create clear solutions. This can be done by:

- Taking photographs of you and your team during work;
- Creating a list of the equipment that is required for your dentistry work;
- Identifying what side of the dental table you have your dental unit and instruments on;
- Assessing the light source used to illuminate the oral cavity;
- Evaluating the chair used to sit on;
- Identifying how many hours per day you are engaged in the practice of dentistry; and
- Exploring how you hold the instruments you use.

Once you have made a thorough assessment and identified the risks, it is time to start working on putting improvements in place.

LAYOUT OF THE ROOM

In an ideal world, veterinary dentistry should be carried out in a purpose-built room separate from other activities within the clinic for hygiene as well as ergonomic reasons. In some



Figure 1: Pinch grip or modified pen grip.

clinics, dentistry is still treated as an afterthought and not afforded the proper surgical status that it is and in others, space and current layout prevent such an investment to be done. But whether you have a dedicated dental room or dentistry is done at the prep table in the central hub of the clinic, ergonomic considerations should guide the design of your work area and efforts should be made to address any risks and hazards identified.

The aim of veterinary dentistry work is to achieve an ergonomic work station where the user can maintain a neutral upright seated position and where furniture, equipment and hand instruments are located in such a way that it reduces awkward manoeuvres, eliminates poor posture and there is easy access to all elements of work.

The dental table, screen for the x-ray images, the x-ray generator itself as well as the dental unit and all hand instruments should all be within easy access and enable the vet or the nurse to carry out their work with minimal exertion. Most vets and nurses carry out dental work in a seated position and this is also where one of the greatest hazards can be identified. Sitting for any prolonged period of time carries risks but sitting and operating in an unnatural position involving a lot of repetitive movements carries an even greater risk and puts twice as much strain on the spine as standing. However, a number of steps and measures can be taken to minimise injuries occurring.



Figure 2: Dental room layout.

- A table that is capable of being raised or lowered to provide optimal working height for differently sized animals and users should be one of the primary considerations when improving ergonomics where dentistry is being carried out. A height adjustable table allows the vet or nurse to be seated with the forearms and wrists resting on the table, with the knees underneath and the thighs at a 45-degree angle towards the floor. A curved dental end enables proper patient positioning and the user to work close in an upright position with a neutral spine. Tub tables, as popular as they are, do not fulfil the criteria required for ergonomic dentistry.
- The chair is another important aspect of ergonomic work. A good quality two-part saddle chair allows the

back to stay in the same position as when standing, the thighs pointing approximately 45 degrees towards the floor, the pelvis kept straight and legs slightly apart. This is generally known as 'riding-like' sitting and greatly reduces pressure on the spine in the lumbar region, increases blood circulation and allows for free movement of the upper body.



Figure 3: Correct seated position.

- However, the right table and chair won't help unless lighting and visibility is good. One of the main issues in veterinary dentistry is the limitations posed by the very anatomy of the oral cavity. Small anatomical structures, obstructing tissue and limited access are factors that often result in the vet or nurse adapting a hunched posture with arching neck in order to see properly. Over time, such posture may lead to neck and shoulder strain and is a common contributor to headaches.
- To counter such posture and the risk of pain and discomfort, loupes or surgical telescopes are as important as the dental equipment itself. Most loupes comprise a pair of safety-type glasses with either fixed through-the-lens magnification or externally frame-fixed. The magnification enables the user to see vital anatomical structures at a magnified level suitable for detailed work and at a working distance that is correct for maintaining an upright and neutral spinal and neck position. The working distance is measured from the eye to the level of where the hands rest in its normal and most comfortable working position whilst maintaining an upright and straight position. Important factors to consider when choosing a pair of loupes are weight, frame design and declination angle. Frames with external magnification allows for the declination angle to be adjusted throughout the procedure with the advantage of multiple users being able to use and adjust them for their needs. Through-the-lens (TTL) frames are specifically tailored to an individual user (see Figure 4) and the declination angle, working distance and pupillary distance is uniquely tailored to his or her needs.

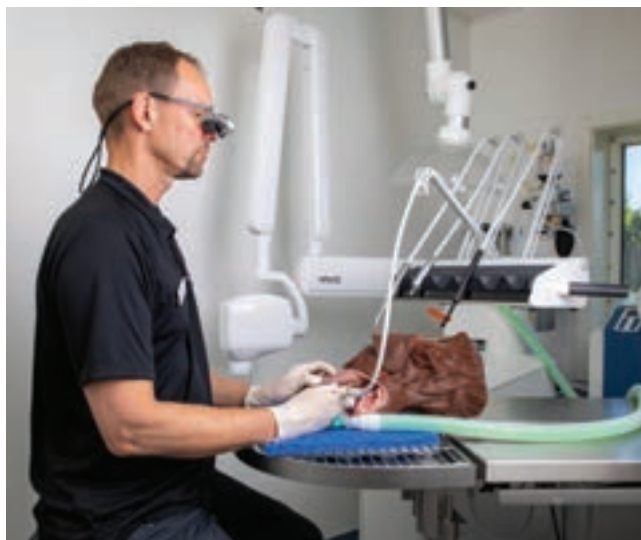


Figure 4: Vet wears through-the-lens frames.

- Good lighting is also essential and should be provided either as overhead ceiling mounted, or castor operated. However, specific targeted light is often required to get a proper overview of the oral cavity and this is best provided by either a small table mounted LED light or as a headlight fitted onto glasses or loupes. The overall aim when sourcing good light for dentistry work should be the achievement of natural daylight at the surgical site.

MAXIMISING ERGONOMIC WORKING CONDITIONS

Once the important basic features of ergonomic work such as furniture and posture have been identified it is time to start looking at placement and use of other dentistry equipment.

A good quality, height-adjustable dental unit should be placed close to or above the patient head. Over-patient dental units with flexible whips are becoming more and more popular in clinics where dentistry forms part of the daily surgical load. The location and whip arm features reduce rotational movements in the upper body and minimises strain on the user's wrist by balancing the weight of the instruments and air and water lines therefore reducing the risk of muscular fatigue. Mobile dental units on trolley on the other hand should be capable of being height adjusted to such level that the user avoids any over extensions of the upper body. Particular attention should be paid to the features of the dental unit and its associated instruments. Curled or twisted airlines, acting like a spring mechanism, should be avoided to prevent pull or drag on the wrist of the user. Swivel couplings on the handpieces allows for the airline to maintain a resistance free position and the weight and size of the handpieces should be such that the user can maintain a comfortable modified pen grip throughout the procedure without muscle fatigue.

Hand instrumentation should also be carefully considered, both in terms of its location in the work area and its features and suitability for use. Weight, size, shape and material as well as condition of hand instruments are all aspects that

should be assessed. And one size does not necessarily fit all. When assessing hand instruments, look for large diameter round handles with a texture grip or a material that help facilitate an easy modified pen grip or pinch grip for instruments such as sickle scalers and curettes. Elevators and luxators, originally adapted from human dentistry, have historically been too large in both handle and shaft size to fulfil the criteria required for ergonomic veterinary dentistry. In contrast to human dentists, vets often find themselves prolonged dental surgeries with multiple extractions and luxators and elevators are undoubtedly the most frequently used hand instrument. To prevent fatigue and strain injuries and enable control and comfort, the luxator or elevator handle should fit comfortably in the palm of the hand and the shaft length should be such that it allows the user to rest the index finger near the working end for control. Too long of a handle and the user will have to grasp too hard to maintain a hold with the added risk of injury to both user and patient. If the shaft on the other hand is too long, there is no control of movement and, once again, there is a real risk of injury to both user and patient.



Figure 5: The elevator handle should fit comfortably in the palm of the hand.

Prolonged or repeated use of any hand instrument that requires some exertion of force, pinch or modified pen grip can contribute to strain injuries, pain and fatigue. In order to minimise these risks, opt for instruments with light-weight handles and frequently change between instrument type or procedure in order to avoid excessive time performing one specific type of motion. Maintaining instrument sharpness will also greatly reduce risk of injuries and shortens overall procedure time.

SUMMARY

Dentistry is a growing field within veterinary medicine and with improved techniques and knowledge to diagnose and treat dental pathology, the time spent treating patients with dental disease is increasing. With this in mind, it is even more important to learn and acquire habits that ensures ergonomic working. A functional review of the dental work station with ergonomic thinking in mind, followed by the implementation of necessary changes will ensure that the veterinary profession can remain physically functional to perform dentistry even with an increasing workload.