

Improving Mobility. Does human intervention hinder or help?

Iams Clinical Nutrition Symposium,
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Introduction

A leading panel of experts in small animal physiotherapy and rehabilitation, surgery, nutrition, and human obesity, met at the Iams Clinical Nutrition Symposium on February 10th 2006 in Montreux, Switzerland. At the centre of the discussion was how human intervention can positively influence mobility in companion animals, and how dogs could actually help improve the lifestyle of overweight humans to help facilitate weight loss and improve human mobility.

Some of the most rewarding aspects of pet ownership come from the mobility that pets so obviously enjoy. Whether it's taking dogs for a walk, or watching cats' agility as they chase imaginary prey, the fact that pets have freedom of movement helps create that very special human-animal bond.

There are however problems such as trauma, breed related (genetic), medical, as well as obesity, that can contribute to reducing pets' mobility and thus impacting on their ability to exercise. Any compromise on their mobility will also affect the enjoyment of daily interactions that can be shared by their owners.

This report is compiled by four leading experts from the field of veterinary medicine, as well as human medicine. By looking at mobility from four very different perspectives it highlights how human intervention can potentially hinder mobility, but importantly it shows that human intervention is ultimately critically important to help improve mobility and the long-term well-being of dogs and cats.

The report explores the reasons why we see overweight pets and its impact on mobility, the role of surgery in redressing mobility issues, as well as how physiotherapy and rehabilitation can benefit these patients. Finally, the human perspective looks at the effects of modern lifestyle and eating habits and what impact these have on mobility, and how dogs can play a pivotal role in improving the human lifestyle.

Key findings from the expert panel include;

- up to 44% of dogs and up to 35% of cats are overweight or obese
- it is estimated that as many as 20% of dogs suffer from osteoarthritis and 34% of cats suffer from joint problems which can affect their mobility
- weight loss is an important factor for improving mobility
- cats and dogs are predisposed to trauma of the limbs due their lifestyle
- over the last 10 years there has been dramatic advancement in surgical management techniques to improve mobility
- total hip and elbow replacements are available to give pain free mobility
- animals with orthopaedic disorders can get into a vicious cycle of decreased daily exercise and increased weight gain

- combining weight loss and physiotherapy significantly improves existing lameness and mobility
- owners are very important for any implementation of physiotherapy and rehabilitation regimes to help improve patients' mobility
- the last two decades has seen a rapid, world-wide spread of mobility-related diseases in humans, even in relatively poor countries
- mobility of humans has been reduced due to changes in our lifestyle and eating habits
- dogs offer a unique opportunity to help encourage overweight humans to exercise more and improve their mobility

Expert Panel



Dr. Dan Carey, DVM: a veterinarian and Director of Technical Communication of The Iams Company, based in the USA. He is co-author of 'Canine and Feline Nutrition' and has spent the past 25 years in clinical nutrition.



Dr. Jean-François Bardet, DVM, MS, DipECVS: a veterinarian and former Associate Professor of Surgery at Maisons-Alfort, Paris, France. He is a Diplomate of the European College of Veterinary Surgery and runs a successful referral clinic near Paris.



Dr. Barbara Bockstahler, DVM, FTA Physical Therapy and Rehabilitation: a veterinarian and Specialist for Physical Therapy and Rehabilitation Medicine, from the University of Veterinary Medicine, Vienna, Austria, and co-author of 'Essential facts of physiotherapy in dogs and cats'.



Dr. Erik Hemmingsson, MSc, PhD: a researcher at the Karolinska Institutet, Department of Medicine, Karolinska University Hospital, Stockholm, Sweden, where he carries out research studies at the Obesity Unit looking at the effects of lifestyle on human health.

The role of nutrition and the owner

Dr Dan Carey, DVM

Mobility and the detrimental impact of excess body weight have a strong interrelationship. It is estimated that as many as 20% of dogs suffer from osteoarthritis and 34% of cats suffer from joint problems. Added to this are the reports suggesting that up to 44% of dogs and 35% of cats are overweight or obese, and together it's a recipe for a negative impact on pets' mobility. And the prevalence of weight problems is not only increasing, it is also correlated to owners' body condition, and is seen commonly in situations in which pets have a prominent relationship with humans.



Maximising the mobility of our pets is important for our health as well

But why do we see these high numbers of overweight/obese pets? There are no reports of a global shift in dog metabolism that would predispose them to excess body weight. The classic balance of caloric intake versus expenditure still works, but it's obvious that many pets are getting too many calories and not burning them off – this imbalance leads to insidious weight gain and eventually obesity. In addition, if our pets' activity is decreased it can result in a decreased ability to be mobile because any increase in body weight due to this decreased activity can place greater demands on their musculoskeletal system, and this can be exacerbated if there are also any underlying joint problems. In cats, obesity will make them five times more likely to become lame and require veterinary treatment. Since pet owners want their pets to live longer and in closer association with themselves, quality of life issues such as reduced mobility are becoming more important for both the pets and their human families.



Examination of joint mobility to help asses for osteoarthritis.



Veterinary Nurses can provide invaluable support to owners whose pets are undergoing a weight loss programme

The challenge for both veterinarians and pet owners is to avoid practices that can contribute to eventual lameness and to be vigilant to correct any weight gain that can aggravate existing age-related, or developmental, joint changes. It is difficult for people to address human osteoporosis occurring in the ageing population when the 'prevention' needs to be done during an individual's teenage years. However, it is much easier for our pets since we can control their diet much better than humans control their own. Moderate, controlled growth of puppies with careful attention to calcium intake (recommendation is to feed 0.8% calcium 'as fed') has been shown to reduce the severity and clinical expression of developmental bone diseases.¹ While this does not change the presence of genetic bone disease such as hip dysplasia, it can reduce the juvenile lameness associated with those diseases. And, as young adults, maintaining activity and controlling caloric intake to match their exercise can keep dogs at their ideal body weight.

Despite the availability of diets for growth or controlling body weight as maturity advances, up to 44% of pet dogs and up to 35% of cats still become overweight or obese. Holistic intervention programmes to correct these cases are successful but require owner involvement, commitment and veterinary supervision. Complete weight loss programmes are available through veterinary clinics. The involvement of veterinary nurses can help ensure that these programmes are successful. Separate studies have clearly shown weight loss is possible. Further, in dogs that are already lame, they can reduce their lameness and, presumably, their discomfort, by simply reducing their excess weight with specially formulated veterinary diets. These benefits have been shown in dogs with osteoarthritis of the hips. In a study using the special veterinary weight loss diet Restricted Calorie Formula (Eukanuba Veterinary Diets, The Iams Company) a 76% improvement in lameness

scores after weight loss was recorded.² Studies have even shown that controlled weight can delay the need for arthritis medications or reduce the amount needed in affected dogs.³

The ideal situation includes preventive care with the appropriate diet and exercise. Puppy foods should be tailored to the expected adult size of the pup and fed carefully to avoid excessively rapid growth. Adults benefit from 20-30 minutes of exercise daily, this also helps strengthen the bond between owner and dog. And, all pets benefit from a diet matched to their life stage and life style. Highly active dogs and cats need more energy dense food with higher fat levels while less active adults need a food with some of the fat replaced by selected carbohydrates that discourage weight gain, such as maize, barley and sorghum. And, a vitamin like compound, L-carnitine, is useful to have in weight loss diets for dogs and cats to help burn fat and maintain lean muscle mass.



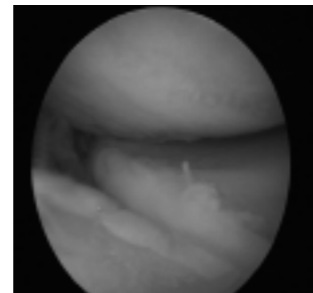
Dogs with an ideal body weight will have a better chance of maintaining their mobility.

With informed supervision, feeding the appropriate diet, and a correct exercise regime for dogs, our pets can have a long, healthy life with a reduced impact from weight gain. Human intervention right from the start of our pets' lives, and at any times of weight gain, or joint problems, will undoubtedly help ensure that we not only maintain, but also help improve our pets' mobility.

Surgical management of mobility disorders in companion animals

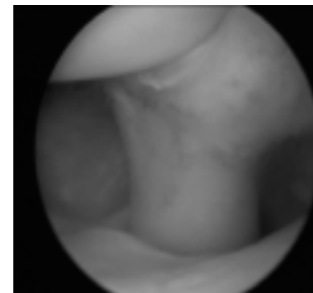
Dr JF Bardet, DVM, MS, DipECVS

Mobility problems in our companion animals have helped drive the need for more advanced state of the art orthopaedic techniques for their surgical management. Indeed, over the last 10 years there have been tremendous advances made in both the diagnosis, brought about by new techniques such as MRI and CT scans, as well as the surgical management, of orthopaedic problems. And, relatively new techniques such as arthroscopy⁴ have led to less invasive surgery and quicker recovery times for our patients.



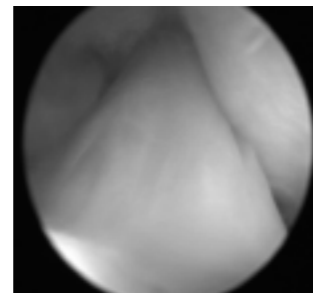
Medial arthroscopic view of an elbow with eburnation of the medial coronoid process (MCP) and medial humeral condyle.

But why do we need all these new techniques? Well, firstly dogs and cats are by their very nature prone to traumatic orthopaedic problems, fractures and dislocations being common complaints. Added to this we have the genetics that can predispose certain breeds of dogs to crippling osteoarthritis of the elbow (united anconeal process, osteochondrosis dissecans (OCD)), shoulder (OCD), hock (OCD) and hips (dysplasia). Certain problems, such as a ruptured anterior cruciate ligament (ACL) in the knee, are also seen in some of our top athletes, especially footballers and skiers. Finally, whatever the cause of the problem, it is estimated that 20% of adult dogs have osteoarthritis and that 34% cats have joint problems, which can affect their mobility.



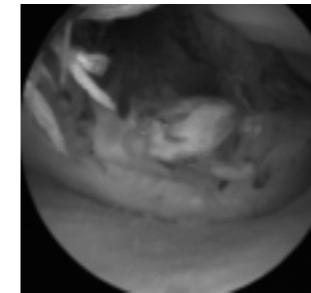
Normal arthroscopic image of the biceps tendon

But one problem we face as veterinarians is that owners of affected animals may fail to recognise that their pet has a problem. In ageing dogs the reluctance to exercise may be attributed to 'getting old', rather than to incipient osteoarthritis. Cats are particularly good at 'hiding' joint problems. A recent study revealed that only 17% that had osteoarthritis of the joints actually showed lameness. Inability, reluctance or difficulty to jump, or only jumping to a reduced height, are common complaints in affected cats,⁵ and these signs may be missed by their owner. Inactivity is also another common feature. And, cats are notoriously difficult to examine for joint pain and discomfort as they resist limb palpation at the best of times.



Normal cranial cruciate ligament

An added problem is excess weight – the numbers of affected dogs and cats are high, up to 44% and 35% respectively. Sometimes owners are not aware of the problems that excess weight can place on the joints, even if the joints are normal initially. Excess weight affects not only the normal mechanics of the joints increasing the wear and tear but also the surgical access to the joints. The access to the hip for a total joint replacement is made all the more difficult if there is excess fat at the surgical site. And, adipose tissue is not inert, it is actually responsible for the production of inflammatory chemicals (cytokines) that have been linked to chronic diseases like osteoarthritis. Post-operative recovery can be impeded due to excess weight, however it can be difficult to encourage weight loss pre-

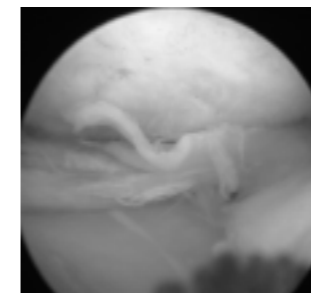


Arthroscopic view of a torn biceps tendon

operatively due to the sometimes crippling nature of the mobility complaint. There are additional risks associated with adiposity and surgery with the anaesthetics risks being a concern in some cases. Weight loss must be encouraged in these patients, if possible before surgery, but it will be more likely that it will have to be post-operative.

The role of the veterinarian in helping to restore, or to improve mobility, also encompasses the full and frank discussion with the owners over the potential surgical technique(s) available. The potential choice and prognosis must also be balanced against the owner's desires and wishes, the patient's long-term needs, as well as cost implications. However, a full and open discussion will normally allow for an effective decision over the how the management of the pet's condition should be undertaken.

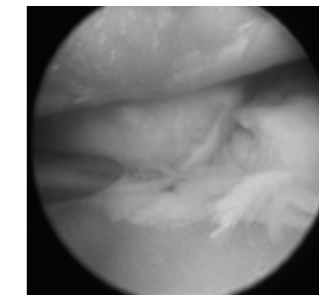
Nowadays we have access to many state of the art techniques to help redress mobility problems. We have total hip replacement and more recently total elbow replacement, and we are even talking about knee replacement in the future. Companion animals do indeed benefit from such procedures with improved pain free mobility. Reduced dependency on pain killing drugs can also be another benefit, as well as a prolongation of the life-span due to a reduction in the crippling pain of disease.



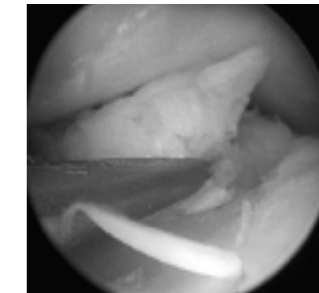
View of a torn medial meniscus

The more recently adopted technique of arthroscopy has made another advancement in improving the mobility of our patients by helping treat problems in the major skeletal joints.⁶ The advantages of arthroscopy are that it is minimally invasive and it can perform intricate intra-articular procedures in multiple joints on the same day. Post-operative recovery is relatively quick compared to more conventional surgical techniques and there is normally less pain following this technique. These are important advantages for the patient, owner, as well as the nursing staff who take charge of their recovery.

So where does the future look to take us in helping improve our patients' mobility? We have seen, and will continue to see, advances



Medial arthroscopic view of an elbow with a loose medial coronoid process (MCP)



Excision of the MCP

in total joint replacement, and we eagerly wait to see how the elbow prosthesis performs long-term, as well as looking towards a total knee replacement. Continuing advances in arthroscopy means that more and more veterinarians will adopt this technique, and using ever smaller arthroscopes we will be able to explore more joints that were previously inaccessible due to the limitations of the instrumentation. So the future looks bright for our companion animals, and for veterinarians and nurses who take a leading role in helping restore and improve their mobility.

The role of physiotherapy and rehabilitation

B. Bockstahler, DVM, FTA Physical Therapy and Rehabilitation

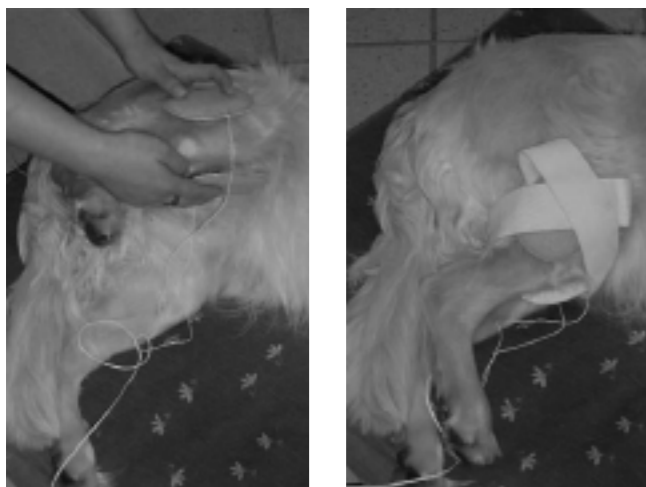
Animals suffering from pain caused by chronic orthopaedic disorders, but also due to more acute diseases, such as prolapsed intervertebral discs and the subsequent decompressive spinal cord surgery, are often unable to walk over a long period of time, to play, to climb stairs or to jump into cars. The vicious circle that develops is a decrease in daily exercise and an imbalance of food intake which often leads to the development of overweight animals. The result is that non-physiological stress is put on their joints and a further deterioration of existing joint problems may well be the result. Two factors together – orthopaedic disorders, and excess weight, have serious consequences for the animal, e.g. the overall exercise ability decrease and due to the increasing adiposity the risk for some diseases (e.g. diabetes mellitus) increases and the cardiovascular system may be compromised.

It is sometimes difficult to escape the combination of pain, adiposity and lameness. First of all, the majority of the pet owners do not know that being overweight is more than just a physical change in body shape and sometimes they refuse to undertake a dietary weight loss programme with their animal. Second, some owners do not recognise that their animal is in pain. It is difficult for them to distinguish between advancing old age and a pain related reluctance to walk. Furthermore it seems much more convenient for the pet owner to give tablets for pain relief than being involved in any personal time consuming therapies such as physiotherapy. But the understanding for the benefits of physiotherapy is increasing because of its use in human medicine as well as positive reports in veterinary medicine.



Kneading: this massage grip leads to an increased blood and lymphatic flow and is used for the treatment of deeper layers of the muscles. Figure in: Bockstahler B, Millis D, Levine D, eds. Essential facts of physiotherapy in dogs and cats. BE VetVerlag, Germany, 2004

More and more veterinarians know that the involvement of the pet owner in any therapy, and the implementation of physiotherapy in patient rehabilitation, are both key for the success of patients with mobility disorders: A close involvement of the owner through in-clinic educational advertisement of the risks of adiposity helps the owner to understand how important the therapy is for their pet. It is mandatory to explain that the combination of weight loss and physiotherapy provides optimal therapeutic results. Indeed, in a study performed at the University of Veterinary Medicine, Vienna, Austria,⁷ it has been shown, that this combination leads to excellent weight loss (Restricted Calorie Formula, Eukanuba Veterinary Diets, The Iams Company) and a significant improvement of existing lameness.



Treatment of the stifle joint with a TENS unit especially developed for animals. The electrodes are placed medial and lateral to the joint

Because of underlying diseases the use of nonsteroidal anti-inflammatory drugs (NSAIDs) may be contraindicated in some patients. However, many physiotherapeutic methods help to reduce the inflammatory response and pain. The outcome of the response of the animal is sometimes so good that the medication can be reduced or is even not necessary any longer. Nevertheless, if it's necessary and possible, the administration of NSAIDs or other pain relievers is important, and if in the first weeks of treatment they are especially helpful. In our experience the combination of different physiotherapeutic modalities like transcutaneous electrical nerve stimulation

(TENS),⁸ massage and training on an underwater treadmill, provide the best results in improving the mobility of the patient. Together with these treatments, performed in the clinic, the physiotherapeutic homework performed by the pet owner is one of the most important parts in the treatment of orthopaedic patients. It is possible to educate the owners in simple but effective physiotherapeutic methods like TENS or massage; also home training like swimming in pools or 'walking plans' can be performed easily at home. This home work has some positive effects: it places the owner closely in the therapy programme and helps to improve the compliance, it motivates owners to stay on course during the whole therapy time and it has therapeutic effects. Because we know that overweight patients, and those with orthopaedic disorders, benefit from such programmes, and that pets with neurological problems can be successfully treated by physiotherapy, it has now been clearly proven that our patients' rehabilitation progress can be accelerated and their mobility improved.



Passive Range of Motion Exercise: Carpal Flexion

In summary, the holistic treatment of patients uses all possibilities of modern veterinary medicine: it implements the conservative and/or surgical treatments as well as dietary programmes and physiotherapy,⁹ and it considers the needs of the individual patient and the pet owner, who plays an important role in the treatment regime to help improve the mobility of their pet.



Instruction of the pet owner in the use of TENS at home. Figure in: Bockstahler B, Millis D, Levine D, eds. Essential facts of physiotherapy in dogs and cats. BE VetVerlag, Germany, 2004.

How modern lifestyles affect human mobility - can dogs help?

Dr Erik Hemmingsson, MSc, PhD

Over the last two decades there has been a rapid, world-wide spread of mobility-related diseases, even in relatively poor countries. The figures are alarming. In September 2005 The World Health Organisation (WHO)¹⁰ estimated that over one billion people were overweight globally, and that if current trends continue, that number will increase to 1.5 billion by 2015. According to WHO estimates, more than 75% of women over the age of 30 are now overweight in countries as diverse as Egypt, Malta, Mexico, South Africa, Turkey, and the United States. Estimates are similar for men, with over 75% now overweight in, for example, Argentina, Germany, Greece, Kuwait, New Zealand, Samoa, and the United Kingdom. And, in 1995, the Chinese Health Authority reported that it estimated 90 million of their population was at least 20% above their ideal body weight.

More alarmingly we are seeing an explosive increase in the prevalence of overweight children, with the UK reporting 10% of 6 year olds, and 18% of 15 year olds, affected.

This worrying trend is due to a number of factors, including a global shift in diet towards increased energy density and 24/7 access to fat, salt and sugar. And, coupled with this is a decreased physical activity, caused by the sedentary nature of modern work (elevators and escalators), transportation (reduced dependency on walking and bicycling), and increasing urbanisation.



Changes in physical activity have led to an increase in the number of people who are overweight. However, the potential exists to change their lifestyle and increase their level of activity.

In the United States over 80 billion Euros were spent on health related effects of the obese/overweight in 1995. This figure is set to rise. Human mobility is both directly and indirectly affected by

body weight issues. A direct effect is because obesity in humans has been associated with osteoarthritis (particularly of the knee), and there is a relationship between increasing adiposity and severity of osteoarthritis.¹¹ Increased weight and stress on skeletal joints, even if healthy, increases the likelihood of permanent damage. This will lead to decreased mobility, and more weight gain, leading to a vicious circle of events, and reduced quality of life. Severe mobility problems can result in the need for total joint replacement such as the hip and knee. An indirect effect on mobility can come from a reluctance to spend time outdoors and to socialise due to low self-esteem and mental health problems brought on by obesity.



Simple lifestyle activities, such as bicycling, stand a good chance of increasing physical activity long-term. Dogs can be an important part of any new lifestyle activity.

The question for public health workers is now what can be done to help combat this world wide epidemic? Some countries, like Switzerland, have adopted educational tactics, 'The Green Fork Campaign', to try and educate people, especially children, on better eating habits. Even TV celebrity chefs in the UK have created a government sponsored nationwide healthy eating campaign in schools.

One area that can be explored to help redress the problem of weight gain is that of exercise, either taken to and from work, during periods of free time, or even during work/school time. Nowadays there is reduced motivation for taking regular exercise (the current recommendations from the Centers for Disease Control and Prevention in the US is for 30 minutes of moderate intensity physical activity, such as brisk walking, per day), as a multitude of many labour saving devices have been introduced both at work and in the home, and so our dependency on exercise is reduced.¹² The important aspect of taking regular exercise is that it is easily accessible, and that it is familiar. Walking and bicycling meet these important criteria for the majority of people, and both adoption and adherence is therefore more likely.

From a public health point of view, dogs can play a critical role in helping people change exercise habits by providing a strong positive call for action. The natural needs of a dog to be taken out a number of times a day is something a dog owner cannot easily resist. Once outside there is the additional benefit of the safety that dogs can offer, given that for some people, especially women, there is a reported reluctance to walk outside due to safety worries in poor light. Additional benefits include increased social interaction for both the dog and owner. If overweight people do not have a dog

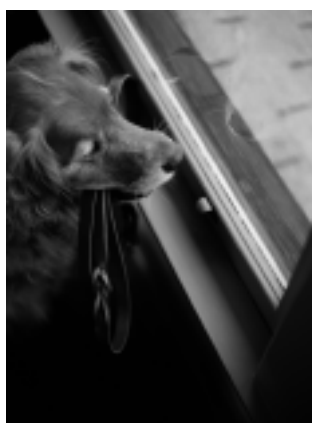
then the potential exists for them to visit a local dog rescue shelter to act as a 'dog walker'. This has added benefits as the dogs get to socialise outside of their shelter and there is the potential that it will be adopted by their new human companion.



There are many benefits from dog walking, including weight loss, and positive social interactions, for both the owner and their pet

The main aim of dog walking would be to encourage overweight owners to take at least 10,000 steps a day to help facilitate weight control. It is known that in certain societies, where the population walks regularly, weight problems are uncommon. This is seen in the Amish people of North America. The Amish, who refrain from using electricity and cars, accumulate 18,425 walking steps/day-men (0% obesity) and 14,196 steps/day-women (9% obesity), compared to 8,500 steps/day in Swedish women (12% obesity), and 6,500 steps/day in Colorado adults (17% obesity, one of the leanest US states). And this is despite the Amish also having access to high calorie diets.

So far, a 6 month pilot study involving overweight owners and dogs showed that regular walking resulted in 54% of the owners losing weight (mean loss of 3% of starting weight) and 90% of the dogs (mean loss of 10% of starting weight).¹³ The potential therefore exists for dogs to become a central part of a weight-loss programme in humans by helping them to take daily exercise. Dogs offer a strong call for action, as well as other benefits that come from the human-animal bond. Any weight loss in humans will improve their mobility by reducing the weight stress on their joints and allow them more freedom of movement.



Dogs offer a unique role to help positively change our lifestyle and to facilitate weight loss.

Conclusions

Mobility in companion animals can be affected both positively, and negatively, by human intervention. However, the opportunities for intervention to improve mobility are many and varied, ranging from weight management, state of the art surgery, physiotherapy and rehabilitation at home, to exploiting the strong human-animal bond in encouraging daily exercise.

Careful control of feeding by the owner, and the advice of veterinarians and nurses on the effects on body weight after neutering for example, can help ensure that pets maintain an ideal body weight. The increasing use of instrumentation such as arthroscopes, as well as total hip and elbow replacements, give dogs and cats access to state of the art surgical procedures that can help them restore and regain their mobility. And, involving the owner with their pet through physiotherapy and rehabilitation at home will help contribute to an improved outcome in patients recovering from mobility disorders. Finally, the role of dogs in both changing and improving the human lifestyle towards increasing exercise shows how canine mobility can help improve human mobility.

Both veterinarians and nurses are central to support these approaches for improving mobility through helping educate owners and for the implementation of dedicated weight loss programmes and other patient support protocols. Such support really captures the multi-disciplined approach needed in cases where mobility is compromised and clearly shows that human intervention ultimately results in helping to improve mobility in cats and dogs.

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For any further information on the Iams Clinical Symposium 'Mobility: a multi-disciplined approach', and this report 'Improving mobility. Does human intervention hinder or help?' please contact your local Iams Representative or Astrid Jacobs on +41 22 709 6552 or Jacobs.a.3@pg.com

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