International Satiety Weight loss Programme:
Real-life cases of 1,300 cats and dogs
in 27 countries
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Introduction

Obesity is a disease that has reached epidemic proportions among pets worldwide. Approximately one dog and cat out of every two (APOP survey 2013, Courcier 2010, Russell 2000, Mc Gready, 2005) is considered to be obese or overweight. Research has demonstrated that obesity is the cause of negative effects:

1. It increases the incidence of other diseases such as diabetic mellitus in cats and osteoarthritis in dogs
2. It reduces their lifespan
3. It reduces their quality of life

The paradox of this disease lies in the fact that although it is easy to diagnose and to treat (by controlling energy intake versus energy expenditure), veterinary clinics struggle to engage owners in successful weight loss programmes for their pets. The reason for this is the underlying cause of obesity, which is quite simply that overfeeding the pet is mistaken as an expression of love, rather than as a route to obesity, and reinforces a vicious cycle of begging and indulging pets by feeding scraps and treats in between meals.

ROYAL CANIN® is committed to improving the wellbeing of dogs and cats through the best possible nutrition based on scientific evidence and facts. It is with this intention that we launched the project "International Satiety Weight Loss Programme".

Capitalising on the passion of our associates and veterinary clinics for animal health, we decided to collect data from across the world to provide stronger arguments in response to the following questions:

- How can we grow the confidence of veterinary clinics in weight loss programmes?
- How can we provide the veterinary profession with more solid arguments to open up a healthy discussion with owners about their pets’ weight?
- How can we help pet owners to change feeding habits?

ROYAL CANIN® is proud to present the results of the greatest dog and cat weight loss programme ever performed in the world. 405 veterinary clinics in 27 different countries participated in this study and a total of 1,325 dogs and cats successfully completed a 3-month follow-up. We would like to thank all the veterinary clinics and associates involved in this project for their participation, their passion and for having made this study possible.

Bernabé Moreno
Global Veterinary Product Manager
ROYAL CANIN®
Material & Methods

Enrolment criteria

The whole protocol of the International Satiety Weight Loss Programme was submitted to and approved by the ROYAL CANIN® Committee for Animal Ethics and Welfare.

Overweight client-owned cats and dogs with a Body Condition Score (BCS) ≥ 7/9 were enrolled in private veterinary practices from the 27 countries participating in the study.

Cats and dogs were considered eligible for the study if they were in good health apart from being overweight and if they had reached their adult size. Non-inclusion criteria were pregnancy or lactation, growth, a history of adverse food reactions, a requirement for a specific therapeutic diet other than a weight loss diet, and any requirement for a therapy that may interfere with weight gain.

Body Condition Score

Diets & Rationing

Owners were asked to feed diets from the ROYAL CANIN® Satiety range (one diet alone or a combination of dry and wet diets). In cats that were used to being fed moist food as part of their diet, ROYAL CANIN® Obesity Management wet was suggested, as a wet Satiety diet is not yet available.

Target body weight was determined at inclusion visit, and the initial daily energy allocation was calculated, ranging from 60 to 80 kcal/kg0.75 of target body weight for dogs, taking into account sex and neutered status, and set at 53 kcal/kg0.711 of target body weight for cats. These calorie allocations were adapted from previous weight loss trials (German et al., 2010, German et al., 2007, German et al., 2008, Bissot et al., 2010) and based on experience obtained at the ROYAL CANIN® Weight Management Clinic in Liverpool.

At each follow-up visit, the feeding recommendation was adjusted as needed to achieve the desired weight loss and to target a weekly weight loss comprised between 1 and 3% of initial body weight in dogs and between 0.5 and 2% in cats.

All data was collected through a web programme that automatically calculated the energy allocation and converted it into daily rations of each product. This programme also estimated the kinetics of weight loss, to suggest calorie adjustment at each follow-up visit, depending on the calculated rate of weight loss.

Study design

Body Weight (kg) BW

Target Body Weight (kg) TBW

Body Condition Score BCS

Activity Levels (AL)

Quality of Life (QL)

Begging Score (BS)

Measurements

Body Condition Score (BCS)

These scores were recorded by the veterinarian during a discussion with the owner. A minimum of 2 items from the scoring description were required to validate a scoring level, this ensured that general trends were recorded and not «one-off» effects. The validation of a minimum of 2 items in the scoring description was required to validate a scoring level.

Activity Level (AL) & Quality of Life (QL)

Begging Score (BS)
Activity level scoring for dogs

<table>
<thead>
<tr>
<th>SCORING</th>
<th>ACTIVITY LEVEL DESCRIPTION</th>
</tr>
</thead>
</table>
| -1      | - My dog is not active.  
        |  • My dog is rarely playful when going out for a walk. |
|         |  • My dog tends to drag behind me during walks. |
|         |  • My dog seems to have reduced mobility: she/he is reluctant to run or to climb stairs. |
|         |  • My dog seems to have joint pain and stiffness. |
|         |  • My dog is often out of breath after short periods of exercise. |
| 0       | - My dog seems normally active to me.  
        |  • My dog is a bit playful. |
|         |  • My dog can climb to higher places but slowly. |
|         |  • My dog is out of breath only after long periods of exercise. |
| +1      | - My dog is very active inside and outside the household.  
        |  • My dog is very playful. |
|         |  • My dog enjoys exercising. |

Activity level scoring for cats

<table>
<thead>
<tr>
<th>SCORING</th>
<th>ACTIVITY LEVEL DESCRIPTION</th>
</tr>
</thead>
</table>
| -1      | - My cat is not active.  
        |  • My cat spends most of her/his time sleeping. |
|         |  • My cat is not playful. |
|         |  • My cat has trouble climbing, jumping up and off high places (kitchen counter, cat tree…). |
| 0       | - My cat seems normally active to me.  
        |  • My cat is a bit playful. |
|         |  • My cat can climb up high places if they are not too high. |
| +1      | - My cat is always ready to play with me.  
        |  • My cat is able to climb, jump on and off any high places (kitchen counter, cat tree,…). |

Quality of life scoring for dogs

<table>
<thead>
<tr>
<th>SCORING</th>
<th>QUALITY OF LIFE SCORING</th>
</tr>
</thead>
</table>
| -1      | - My dog seems anxious and is not enjoying life.  
        |  • My dog is not playful when stimulated. |
|         |  • My dog does not respond to orders and she/he does not learn new things. |
|         |  • My dog can be irritable and/or aggressive towards some people and/or pets. |
|         |  • My dog has trouble climbing stairs or any high places. |
|         |  • My dog has mobility issues: joint pain, stiffness, out of breath after exercise. |
| 0       | - My dog does not seem anxious.  
        |  • My dog does not show any signs included in score “-1” but always limited in duration and frequency. |
| +1      | - My dog seems to enjoy life.  
        |  • My dog does not show any signs included in score “-1”. |

Quality of life scoring for cats

<table>
<thead>
<tr>
<th>SCORING</th>
<th>QUALITY OF LIFE SCORING</th>
</tr>
</thead>
</table>
| -1      | - My cat seems anxious.  
        |  • My cat does not actively explore her/his environment and is not playful. |
|         |  • My cat hides more frequently or often attempts to hide. |
|         |  • My cat spends a greater proportion of her/his time awake (e.g. Exhibiting alertness and scanning behavior). |
|         |  • My cat shows signs of irritability towards some people or pets. |
|         |  • My cat has trouble grooming herself back. |
|         |  • My cat has trouble climbing, jumping up and off high places (kitchen counter, cat tree…). |
|         |  • My cat has mobility issues: joint pain and/or stiffness. |
|         |  • My cat is very often reluctant to be stroked and handled. |
| 0       | - My cat does not seem anxious.  
        |  • My cat is a shy cat and tends to hide sometimes. |
|         |  • My cat can be slightly irritable towards some pets or people. |
|         |  • My cat can climb up high places if they are not too high. |
| +1      | - My cat seems to enjoy life.  
        |  • My cat does not show any of the signs described in score “-1”.

Begging scoring for cats and dogs

<table>
<thead>
<tr>
<th>SCORING</th>
<th>BEGGING SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>My pet shows some of the begging manifestations right before meal.</td>
</tr>
<tr>
<td>-1</td>
<td>My pet shows some of the begging manifestations right before meals and occasionally between meals.</td>
</tr>
<tr>
<td>-2</td>
<td>My pet shows some of the begging manifestations right before meals and often between meals and right after meals.</td>
</tr>
<tr>
<td>-3</td>
<td>My pet shows some of the begging manifestations right before meals and constantly between meals and right after meals.</td>
</tr>
</tbody>
</table>

Begging manifestations

- My pet acts as if he/she were hungry.  
- My pet eats very fast and in a gluttonous way.  
- My pet barks, meows and/or whines for more food.  
- My pet tries to steal food or to get into trash and tries to open doors and cabinets.  
- My pet wakes me up at night to be fed.  
- My pet follows me everywhere and is kind of clingy.  
- My pet very often turns around her/his bowl.  
- My pet is irritable and sometime aggressive.
Main Results

Retention rate

A total of 2,214 dogs and 859 cats were considered eligible for the study after initial screening. However, only 1,565 dog-owners and 648 cat-owners were motivated to become involved in the programme. From this initial population that started the diet, 63% of dogs (987) and 64% of cats (414) completed the total number of visits required in the protocol. Complete and reliable data over the 5 visits were available for 926 dogs and 399 cats. All data analyses and statistical comparisons were run using these final groups of 926 dogs and 399 cats.

This retention rate is consistent with other field weight loss studies (Bissot et al. 2010, German et al. 2015, Carciofi et al. 2005, Christmann et al. 2015) but emphasizes the high proportion of patients that can be lost to follow-up during weight loss programmes, and thus the importance of keeping owners motivated for the whole weight loss period and of encouraging veterinarians to follow-up individual appointments.

Key numbers

Complete and reliable data over the 5 visits were available in:
- 926 dogs
- 399 cats
399 cats from 23 countries completed the 12-week study. 52% of cats were from mix-breeds or unknown breeds. 14 different breeds were represented, with an over-representation of Domestic Shorthair (33%). 180 cats were females, and 219 were males. 96% were neutered (169 females and 213 males). Age data was available for 391 cats. The median age was 73 months, ranging from 12 to 189 months. The mean (±SEM) starting weight of the cats was 6.75 kg ±0.08, with an average BCS of 8.0±0.04.

Diet allocation was determined according to the cats’ previous habits. 7.5% were fed dry only, 0.5% wet only, and 26% a combination of dry and wet. Thus, 294 owners were instructed to feed ROYAL CANIN® Satiety Weight Management dry, 2 were instructed to feed ROYAL CANIN® Obesity Management moist and 103 were instructed to feed a combination of these 2 diets.

The mean bodyweight lost (±SEM) over the 12-week study was 10.5% ± 0.31. The large majority of cats lost weight within the study period: 327 cats lost more than 1% of bodyweight (97%), whilst only 5/399 cats gained some weight, and 6 remained stable. 327 cats (82%) lost more than 5% of initial bodyweight. The mean weight loss rate (±SEM) was 0.82 ±0.02 % of initial bodyweight per week. The mean energy allocation for the study duration was 52 kcal/kg0.711/day, based on target bodyweight.

To Assess the kinetics of weight loss, data from a subgroup of 181 cats that strictly followed the protocol timing was analysed. In this subgroup, the weight reduction was found to be significant (p<0.05) at each visit.
**Wellbeing Parameters**

**Cats**

**EVOLUTION OF ACTIVITY**
Activity significantly increased over the course of the study \((p<0.001)\), with the mean activity score rising from -0.28 to +0.29. This finding is completely in line with other studies, mostly conducted in dogs, which show an increase in activity after weight loss. When studying the kinetics of activity levels \((n=181)\), the increase was statistically significant \((p<0.05)\) from the third visit, one month after starting the programme.

**EVOLUTION OF QUALITY OF LIFE**
Owners perceived a significant increase in their cats’ quality of life \((p<0.001)\), with the mean score rising from +0.08 to +0.41. Interestingly, when comparing the cats’ scores for quality of life with their initial body condition score (iBCS), the iBCS was found to have a significant effect \((p=0.02)\). Cats with a higher iBCS (i.e. the most overweight cats) had a lower initial quality of life. However, losing weight had a positive impact on the quality of life score whatever the initial BCS.

**EVOLUTION OF BEGGING**
Despite calorie restriction, a significant improvement of begging signs \((p<0.001)\) was perceived over the course of the study, with a mean begging score that increased from -1.57 to -1.09 (the maximum begging score being 0=neutral in the protocol). When analysing the individual evolution of the begging score between inclusion and the fifth visit, 34% of owners perceived no change in their cat’s begging behaviour, and 48% observed a reduction of begging over the course of the study. In the 181 cats who strictly followed the protocol timing, owners perceived a significant improvement in their cats behaviour from the first month visit.

**Key numbers**

- Despite calorie restriction, 34% of owners perceived no change in their cat’s begging behaviour.
- 48% even saw a reduction of begging over the course of the study.
- After 3 months of following the Satiety Programme, 90% of cat owners were satisfied or very satisfied.
926 dogs from 27 countries completed the study. 568 of them were females, 358 were males, 72.5% (433 females and 238 males) were neutered. Dogs were from 82 different breeds, and 32% of them were mix-breed or of unknown breed. The most represented breeds were Labrador Retriever (60), Beagle (37), Pug (34), Dachshund (30), Chihuahua (24), and German Shepherd (24). Age data was available for 903 dogs. The median age was 74 months, ranging from 12 to 193 months. The mean (±SEM) starting weight of the dogs was 25.54 kg ±0.50, with an average BCS of 7.7±0.02.

Diet allocation was determined according to the dogs’ previous habits. 750 were fed dry only [Satiety Small dog for 150 and Satiety Weight Management dry for 600 of dogs], 6 were fed wet only [Satiety Weight Management Wet], and 170 were fed a combination of dry and wet (61 with Satiety Small Dog, and 109 with Satiety Weight Management dry).

Population

Dogs

926 dogs from 27 countries completed the study. 568 of them were females, 358 were males, 72.5% (433 females and 238 males) were neutered. Dogs were from 82 different breeds, and 32% of them were mix-breed or of unknown breed. The most represented breeds were Labrador Retriever (60), Beagle (37), Pug (34), Dachshund (30), Chihuahua (24), and German Shepherd (24). Age data was available for 903 dogs. The median age was 74 months, ranging from 12 to 193 months. The mean (±SEM) starting weight of the dogs was 25.54 kg ±0.50, with an average BCS of 7.7±0.02.

Weight loss Results

The mean bodyweight lost (±SEM) over the study period was 11.4% ± 0.19. The large majority of dogs lost weight within the study period: 896 dogs (97%) lost more than 1% of bodyweight, whilst only 16 dogs (1.7%) gained some weight and 14 (1.5%) remained stable. 814 dogs (88%) lost more than 5% of initial bodyweight. The mean weight loss rate (±SEM) was 0.88 ±0.01% of initial bodyweight per week. The mean calorie allocation for the study duration was 63 kcal/kg0.75/day, based on target body weight.

Key numbers

- 926 dogs
- 82 breeds
- 27 countries
- 72% neutered
- Mean age 6 years old
- Mean Initial Bodyweight 25.5 kg
- Median Initial Body Score 8/9
**Key numbers**

Despite calorie restriction, 34% of owners perceived no change in their dog’s begging behaviour, 49% even saw a reduction in begging over the course of the study.

After 3 months following the Satiety Programme, 89% of dog owners were satisfied or very satisfied.

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**Wellbeing Parameters**

**EVOLUTION OF ACTIVITY**

Activity significantly increased over the course of the study (p<0.001), with the mean activity score rising from -0.13 to +0.36. This finding is completely in line with other studies, which show an increase in activity after weight loss (German et al., 2012).

**EVOLUTION OF QUALITY OF LIFE**

Owners perceived a significant increase in their dogs’ quality of life (p<0.001), with the mean score rising from +0.12 to +0.47. As shown in cats, the initial body condition score was found to have a significant effect on the quality of life score, whatever the visit number. Dogs which were more overweight had lower initial scores, and losing weight had a positive impact on quality of life whatever the initial BCS. In the 420 dogs who strictly followed the protocol timing, owners could perceive a significant increase in quality of life (p<0.05) from 1 month after beginning the programme.

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**EVOLUTION OF BEGGING**

Despite calorie restriction, a significant improvement in begging signs (p<0.001) was perceived over the course of the study, with the mean begging score increasing from -1.59 to -1.05 (the maximum begging score being 0=neutral in the protocol). When analysing the individual evolution of the begging score between inclusion and the 5th visit, 34% of owners perceived no change in their dog’s begging behaviour, and 49% observed a reduction in begging over the course of the study. Initial BCS did not appear to have a significant effect on the begging score (p=0.49).

In the subgroup of 420 dogs which strictly complied with the protocol timing, the owners noticed an improvement in begging behaviour (p<0.05) as early as 15 days from beginning the programme.
Clinical cases

**Olivia**
- **Breed:** Golden Retriever
- **Age:** 4
- **Sex:** Neutered Female
- **Initial BCS:** 8/9

**Diet:** Satiety Weight Management Dry

**Testimonial:** Olivia’s owner reported a great acceptability of the diet, and a gradual improvement in performance during daily walks. He also noted an improvement in the quality of faeces with this new diet.

**Polpetta**
- **Breed:** Domestic Shorthair
- **Age:** 3.5
- **Sex:** Neutered Male
- **Initial BCS:** 7/9

**Diet:** Satiety Weight Management Dry + Obesity Management moist to start, Satiety Weight Management dry only after 15 days

**Testimonial:** What was the major motivation to enter your cat into the Satiety Programme? I joined the programme to improve my cat’s quality of life and health. My main concern was the possible development of obesity-related diseases such as diabetes, something about which my veterinarian had given me plenty of information.

**What improvements have you noticed in your cat after 3 months?** Effective slimming, as you can see from the weight loss curve! A net increase in activity, a livelier cat, even in summer during which Polpetta was previously much more sedentary. Although my cat has always been picky, he found the food very palatable. My cat lives mostly indoors, so stool consistency is important too. With Satiety the stools are well-formed.
Veterinarians

**USA**

Dr. Teva Stone  
Wellington Veterinary Hospital

*What have been the benefits of the Satiety Programme?*

Weight loss without a doubt! That makes us happy but most importantly it makes the owners happy and the dog/cat healthy! It’s a win-win.

*Can you tell us about your experience during the Satiety Weight loss Programme?*

It was a very positive and exciting experience, combining good response from the owners involved and job satisfaction considering the results obtained in my patients. In many cases I chose a vaccination appointment to communicate to my customers on the subject of obesity, focusing on associated diseases. I also highlighted the extension of life expectancy in pets at their healthy bodyweight.

**Italy**

Dr. Silvana Bonelli  
Cremona Veterinary Clinic

*What were the advantages of the Satiety Weight loss Programme?*

The Satiety programme, which was well structured, allowed me to achieve very good weight loss results. It was also an opportunity for me to communicate more effectively on the importance of proper nutrition.

*How did Satiety help the owners of pets on your weight loss programme?*

Satiety certainly helped thanks to its great taste and its effectiveness, even in some patients with particular digestive sensitivity and/or a capricious appetite.

**Argentina**

Dr. Ana Victoria Garcia  
Drs Hidalgo-Garcia Veterinary Clinic

*Can you tell us about your experience during the programme?*

Sometimes when dealing with obesity the main hurdle is the veterinarian himself, who doesn’t consider obesity as an illness. In addition, the owners often do not see their pets as obese and are reluctant to reduce the amount of food.

*Testimonial: Giuseppe lost 3 kg in 3 months, and is still losing weight. He now has a better fur, and has returned to his normal life, climbing on doors again.*

**Testimonials**

Being part of the Satiety Weight Loss programme has been very rewarding because my clients have seen the results, so they keep buying the food and dieting.
It has never been easy to broach the difficult topic of obesity and over-feeding. Real-life data provided by this programme highlights the difficulty for the veterinary clinics to engage pet owners into coming to the veterinary clinics for a periodic follow-up. Out of the 3,000 patients that were eligible to start the study, only 2213 accepted to be involved in the programme, and about 60% of them completed the 5 visits.

How can we provide the clinic with stronger arguments to educate pet owners on the benefits of a healthy weight and to motivate them to come back to the clinic for follow-ups?

The results of the International Satiety Weight Loss Programme are overwhelming!

Once the pet owner is motivated enough to come to the clinic for periodic follow-ups, the benefits of feeding ROYAL CANIN® SATIETY in only 3 months are huge and conclusive:

- 97% of dogs and cats lost an average of 11% bodyweight;
- Begging behaviour did not increase despite the calorie restriction. Moreover, it was even reduced in 48% of dogs and cats;
- Activity levels were highly increased;
- Quality of life was highly improved.

The main outcome for this weight loss programme is unequivocal: “97% of dogs and cats lost weight, most of them did so without feeling hungry”

As begging is a trigger for pet owners to indulge their pets, we strongly believe that controlling (and even reducing) begging is a key factor that has helped pet owners to break the vicious cycle of begging and over-eating and to comply with the clinic’s recommendations. With Satiety, you can reassure owners that by changing feeding habits, they are not only helping their pet achieve their healthy weight and regain quality of life, but they are also providing their pets with quality nutrition that will keep them happy and satisfied. With Satiety, vets and owners can finally work together to help pets reach a healthier weight and lead a happier, healthier life.
A state of the art obesity clinic: the Royal Canin Weight Management Clinic in Liverpool (UK), which recently celebrated its 10th Anniversary.

In 2005, in collaboration with the WALTHAM Centre for Pet Nutrition, ROYAL CANIN® supported the creation of a state of the art obesity clinic based at Liverpool University Small Animal Teaching Hospital. The objective was to be able to follow, in the best scientific setting, weight loss and weight maintenance programmes in real field conditions.

The ROYAL CANIN® Weight Management Clinic was the first of its kind in Europe, and aimed to provide an outstanding service to clients and veterinary surgeons alike. In this referral clinic, cases are investigated and treated in the same professional manner as for all of the University’s referral services. In addition to facilitating the treatment of many overweight cats and dogs, the clinic allows us to compile a huge amount of information on obesity in pets. Over the past 10 years, this information has been used not only to demonstrate the efficacy of ROYAL CANIN® weight management diets in real field conditions, but also to develop a better understanding of obesity in pets, and to refine methods of treatment and prevention.

The Royal Canin Weight Management Clinic is run by Dr Alex German

Alex German is a Reader in Small Animal Medicine, at the University of Liverpool, and has been practising veterinary medicine for over twenty years. He is both a European and Royal College of Veterinary Surgeons recognised specialist in small animal internal medicine. Ten years ago, he recognised that obesity was the biggest medical problem facing the pets of our time, and since then, has dedicated his career to improving how it is treated. He regularly lectures to veterinary professionals and pet owners across the world, and has published over 100 research communications in this field.

The ROYAL CANIN® Weight Management Clinic was the first of its kind in Europe, and aimed to provide an outstanding service to clients and veterinary surgeons alike. In this referral clinic, cases are investigated and treated in the same professional manner as for all of the University’s referral services. In addition to facilitating the treatment of many overweight cats and dogs, the clinic allows us to compile a huge amount of information on obesity in pets. Over the past 10 years, this information has been used not only to demonstrate the efficacy of ROYAL CANIN® weight management diets in real field conditions, but also to develop a better understanding of obesity in pets, and to refine methods of treatment and prevention.

Key numbers

- **280** cases followed in the ROYAL CANIN® Weight Management clinic
- **1,043 kg** of fat lost
- **20%** bodyweight lost on average
- **56,859** total number of days dieting for ROYAL CANIN® Weight Management Clinic patients
The typical pathway of an obese patient at the ROYAL CANIN® Weight Management Clinic

**Pre Consult Questionnaire**
- Sent to the owner before the 1st consultation
  - Collection of full information about the patient’s lifestyle and dietary history
  - 5 different sections:
    - Patient information
    - Family information
    - Feeding & treating
    - Exercise & behaviour
    - Environment

**First Consultation**
- Half day duration
  - Full clinical examination
  - CBC (complete blood cell) count, serum biochemical analysis, urinalysis.
  - Appropriate diagnostic investigations for any associated disorder.
  - Assessment of body weight and body composition (DEXA Scan, Body Condition Scoring, Morphometric measurements)
  - Determination of target body weight and tailor made weight loss regimen using ROYAL CANIN® Weight Management diets
  - Owner counsel for lifestyle modifications (feeding habits, activity, etc.)

**Monitoring**
- Every 7-21 days
  - Clinical examination
  - Body weight measurements
  - Adjustment of dietary plan if necessary (based on the rate of weight loss and information provided by owner or diary records)

**End of weight loss**
- When target bodyweight is reached
  - Full clinical examination
  - CBC count, serum biochemical analysis, urinalysis
  - Assessment of body weight and body composition (DEXA Scan, Body Condition Scoring, Morphometric measurements)
  - Determination of daily rations to maintain stable bodyweight: weight check every two weeks with sequential increase of calorie intake until bodyweight is stable

**Maintenance after weight loss**
- Periodic assessment, as required
  - Regular weight checks to avoid weight rebound

**Key numbers**

- More than 100 scientific communications on pet obesity over the past 10 years
- 51 articles published in peer-reviewed journals and 54 research abstracts
- 193 continuing education talks given in 51 countries

- Thorough collection of all information of interest to deal with obesity
- DEXA scan, the gold standard method to assess body composition
- Tailor made adjustments of the regimen: regular phone calls and counsel
- Determination of maintenance energy allocation
- Long term follow-up

- 1,300 cats and dogs in 27 countries
Satiety Weight Management

The weight loss diet backed-up with the most scientific evidence

Peer-reviewed field studies, performed with the collaboration of ROYAL CANIN® Weight Management Clinic, have shown that ROYAL CANIN® Satiety Veterinary diets:

• induce successful and safe weight loss
• promote satiety, reducing voluntary energy intake and begging behaviour
• preserve lean body mass during weight loss
• maintain stable body weight after weight loss
• improve quality of life

ROYAL CANIN® Satiety was shown to improve the outcomes of weight loss in obese pet dogs

A 2010 study (German et al., 2010), conducted at the ROYAL CANIN® Weight Management Clinic (University of Liverpool), compared two nutritional strategies and their performance during weight loss in 42 client-owned dogs with naturally occurring obesity:

• A = ROYAL CANIN® SATIETY Feline, a high fibre dry diet with specific high water-binding fibres;
• B = a mixed ration of ROYAL CANIN® SATIETY Feline dry diet and a pouch of moist diet;
• C = a control high fibre commercial weight loss dry diet without the specific water-binding fibres.

The weight loss diet backed-up with the most scientific evidence

A randomised, single-blinded, controlled field trial in 48 obese client-owned cats assessed the outcomes of a 20 week weight loss programme (Bissot et al., 2010) and compared 3 different dietary strategies:

• A = ROYAL CANIN® SATIETY Feline, a high fibre dry diet with specific high water-binding fibres;
• B = a mixed ration of ROYAL CANIN® SATIETY Feline dry diet and a pouch of moist diet;
• C = a control high fibre commercial weight loss dry diet without the specific water-binding fibres.

The main outcomes of weight loss, such as amount and rate of weight loss, or mean energy allocation did not differ between diets, but there were significant differences regarding the owners’ perception of their cats behaviour and well-being. Owners reported an increase in activity with time, which was statistically significant only for diet A. Over the 20 week study, a diet effect was also observed on the owner-reported “hunger score”. This score was significantly lower with both “Satiety” strategies (A and B), as compared with the control competitor diet. With diet C, cats vocalised more and sought more contact with their owner, which are typical signs associated with begging.

A 2010 study (German et al., 2010), conducted at the ROYAL CANIN® Weight Management Clinic (University of Liverpool), compared 3 different weight loss programmes in obese client-owned cats. J Feline Med Surg, 12, 104-12

The weight loss diet backed-up with the most scientific evidence

Energy intake 3 hours after a first restricted meal

A high protein, high fibre diet (Royal Canin Obesity Management Canine dry); n=27

Baseline characteristics (signalment, percentage of overweight, and body fat percentage) were not significantly different between the two groups. The weight loss regimen was the same between the two groups. However, the percentage of weight loss was greater and the mean rate of weight loss faster with Satiety than with Obesity Management. The percentage of decrease in body fat mass (measured by dual-energy X-ray absorptiometry) was also greater in dogs fed Satiety.


t = 0.029, a, b = a, b = a, b

Begging score

The control of food intake is complex and not fully understood. It involves multiple and interconnected pathways and signal elements, such as hormonal factors, vegetative signs, sensorial and psycho-affective information.

It is much more difficult to evaluate the feeling of satiety in dogs or in cats than it is in humans. Therefore, satiety in dogs and cats is generally assessed using indirect methods and the inclusion of more measurable criteria, such as voluntary food intake and behavioural markers.

Energy intake (in kcal)

How to define and measure satiety in cats and dogs?

Satiety can be defined as the feeling of fullness and the disappearance of appetite after a meal. How can we measure satiety in cats and dogs? The control of food intake is complex and not fully understood. It involves multiple and interconnected pathways and signal elements, such as hormonal factors, vegetative signs, sensorial and psycho-affective information.

It is much more difficult to evaluate the feeling of satiety in dogs or in cats than it is in humans. Therefore, satiety in dogs and cats is generally assessed using indirect methods and the inclusion of more measurable criteria, such as voluntary food intake and behavioural markers.
In dogs, the effect of ROYAL CANIN® Satiety dry in reducing voluntary energy intake was assessed through several crossover studies comparing different diets formulated for weight loss and mainly differing in their protein and fibre content (Neber et al., 2007).

- HPIF (ROYAL CANIN® Satiety): a high protein, high fibre formula
- HP: a high protein formula (ROYAL CANIN® Obesity Management)
- HF: a high fibre competitor diet.

### ROYAL CANIN® Satiety was shown to limit weight rebound after weight loss

When losing weight, the primary objective is to lose body fat while preserving lean body mass. A high protein intake may result in an increased availability of amino acids for protein synthesis and the maintenance of the muscular mass. The protein concentration of low calorie diets must be greater than that of maintenance foods to provide the essential amino acids while restricting the energy intake. Results from several studies in cats and dogs have suggested that a greater protein/calorie ratio has positive effects on the preservation of lean body mass during weight loss.

Clinical weight loss trials in cats and dogs fed ROYAL CANIN® Satiety have shown that the weight was mostly lost in the form of fat mass and that lean body mass loss was minimal.

In a study performed in 2010, at the ROYAL CANIN® Weight Management Clinic (German et al., 2010), 15 client-owned obese dogs underwent a weight loss programme with Satiety Canine in which body composition was measured at the beginning of the trial and after successful weight loss, using the gold standard technique of dual-energy X-ray absorptiometry (DEXA). The analysis of body composition results showed that most of the body weight lost (92.3%) was composed of body fat. More recently, body composition was assessed before and after weight loss in 18 client-owned cats fed ROYAL CANIN® Satiety Feline dry, either alone or in a combination with ROYAL CANIN® Obesity Management wet (Stegalle et al., 2014). The results showed that the loss of lean body mass only amounted to about 6%.

### Evaluation of mean body composition (DEXA scan)

- Lean body mass
- Body fat
- Initial body composition
- After weight loss

### ROYAL CANIN® Satiety was shown to limit weight rebound after weight loss

Once its target bodyweight is reached, the pet enters a critical weight stabilisation phase, and weight rebound after weight loss is a frequent issue (Deagle et al., 2014, German et al., 2012). The long-term use of ROYAL CANIN® Satiety can significantly limit regain in the follow-up period.

Recent research (German et al., 2011, Senzier et al., 2011) has shown that obese dogs and cats that maintain target weight after successful weight loss have an average daily metabolisable energy intake that is much lower than current maintenance energy recommendations for inactive pets. Therefore, resuming the pet’s previous diet without controlling its calorie intake would result in rapid weight gain.

### Criteria

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>WEIGHT LOSS DIET</th>
<th>STANDARD MAINTENANCE DIET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Neutered male (11)</td>
<td>Male (1)</td>
</tr>
<tr>
<td></td>
<td>Neutered female (6)</td>
<td>Neutered male (8)</td>
</tr>
<tr>
<td>Age</td>
<td>72 months (19 to 126)</td>
<td>78 months (19 to 110)</td>
</tr>
<tr>
<td>Change from optimal weight</td>
<td>1% (-7 to 27)</td>
<td>7% (0 to 31)</td>
</tr>
<tr>
<td>Follow-up duration</td>
<td>701 days (140 to 1216)</td>
<td>485 days (224 to 1564)</td>
</tr>
<tr>
<td>Status at follow-up</td>
<td>Lost: n=3 (19%)</td>
<td>Lost: n=0 (0%)</td>
</tr>
<tr>
<td></td>
<td>Stable: n=11 (64%)</td>
<td>Stable: n=3 (19%)</td>
</tr>
<tr>
<td></td>
<td>Gained: n=3 (18%)</td>
<td>Gained: n=13 (81%)</td>
</tr>
</tbody>
</table>

### The weight loss diet backed-up with the most scientific evidence

Real-life cases of 1,300 cats and dogs in 27 countries
Achieving weight loss using ROYAL CANIN® Satiety was shown to improve quality of life

Another study conducted at the ROYAL CANIN® Weight Management Clinic, published in 2012, provided the first scientific evidence of the benefits of weight loss on quality of life (German et al., 2012b). This study included 50 obese dogs, of various breeds and genders. A weight management protocol was instigated for each dog, using ROYAL CANIN® Weight Management diet. Owners were asked to complete a standardised questionnaire designed to determine health-related quality of life (HRQOL) prior to and after weight loss. Their answers were converted into scores on a scale of 0-6, corresponding to a range of four factors: vitality, emotional disturbance, anxiety and pain. Quality of life improved in the dogs that successfully lost weight. Vitality scores were indeed significantly increased, and pain scores were significantly decreased after weight loss: the more body fat lost, the greater the improvement in vitality scores.

Effect of weight loss on Health-Related Quality of Life


The weight loss diet backed-up with the most scientific evidence.

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INTERNATIONAL SATIETY WEIGHT LOSS PROGRAMME: Real-life cases of 1,300 cats and dogs in 27 countries
References


