OWNER FACTSHEET

BARTON LODGE VETERINARY CENTRE

1 Midland Road, Hemel Hempstead,
Hertfordshire HP2 5BH

Tel. 01442 216048
info@bartonvets.co.uk
www.bartonvets.co.uk

Raw diets

Introduction

Raw diets (also known as raw-meat-based diets, 'biologically-appropriate raw food' or 'BARF' diets) are becoming increasingly popular. As a consequence, we as veterinary professionals would like to provide guidance about the advantages and disadvantages of such foods.

Our advice to pet owners should always be based on:

- Sound scientific evidence, whenever available
- Excellent clinical reasoning
- Informed risk management.

This is so we can help you make decisions about what to feed your pet. As well as ensuring that minimum nutritional requirements are met, the chosen diet should ideally provide optimal (or ideal) nutrition to promote the good health of your pet.

Whatever the type of food you wish to feed, it should meet the following requirements:

- **Complete and balanced nutrition** – the diet should provide every nutrient that your pet needs, in the correct quantities for the pet and not in excessive amounts
- **Digestible** – the nutrients must be bioavailable to the pet consuming the food
- **Palatable** – the food must be appealing to your pet so that they will consume it
- **Not fed in excess** – excessive amounts of energy from any food will lead to obesity. Controlling the amount of food is strongly advised to maintain an ideal body condition score. Further information on body condition scoring is available from the World Small Animal Veterinary Association (WSAVA) (www.wsava.org)
- **Safe** – the food must be safe to feed, being free of anything that may cause harm to you or your pet (e.g. toxic compounds or organisms (pathogens) that cause disease)
- **Achievable** – the recommendation must be within your financial and time budget.

Sustainability of food sources is also of increasing concern for both humans and pets because, if current consumption continues, there will be a food shortage within the next 50 years.

What are raw diets?

Raw diets predominately comprise uncooked ingredients, although different components can vary. Raw diets may contain:

- Meat
- Fish
- Poultry
- Bones
- Meat by-products (offal)
- Unpasteurized milk
- Uncooked egg
- Fruit and vegetables
- Nuts and seeds
- Oils
- Cereals
- Supplements.

Editors: Marge Chandler, Alexander J. German and Georgia Woods
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Types of raw diet

- Home-prepared:
  - Feeding to a recipe
  - No recipe; any available food is fed.
- Prey-model – whole animal carcases are fed.
- Commercially manufactured – within this category, various types are offered, including:
  - Fresh
  - Frozen
  - Freeze-dried
  - Carbohydrate premix with a raw protein source
  - Kibble with freeze-dried raw pieces
  - Diets with a raw-meat coating.

NB: Recipes may not be complete and balanced. Commercially prepared raw diet recipes should be created by professional formulators trained in the commercial formulation of pet foods. Ideally, the formulation should also have been developed in consultation with an appropriately qualified individual.

- **Appropriate qualifications include:**
  - **PhD in animal nutrition**
  - **Diplomate of the American College of Veterinary Nutrition (ACVN)**
  - **Diplomate of the European College of Veterinary Comparative Nutrition (ECVCN).**

In the case of home-prepared raw diets, it is recommended that the recipe be designed, overseen or approved by a Diplomate of either the ACVN or the ECVCN.

What are the advantages of feeding raw diets?

Evidence-based advantages of raw diets

- Currently, there is insufficient published scientific evidence confirming many of the suggested benefits of raw diets. However, there is some emerging evidence for the following:
  - Dental benefits from chewing raw bones with meat:
    - There is some evidence to suggest that the texture of chewing raw bones with meat could be beneficial for dental calculus (tartar). However, there is no evidence that it improves oral health or prevents plaque, periodontitis or tooth loss. Bones, raw or cooked, can also pose a risk of dental fractures, oesophageal obstructions and foreign bodies
  - Improved coat quality:
    - It has been suggested that this might be the result of feeding a diet with an increased fat content. Of course, any benefits of feeding a high-fat diet should be balanced against potential risks (e.g. increased risk of obesity and pancreatitis)
  - Improved digestibility:
    - This is partially true in that diets based on raw meat are typically more digestible than dry proprietary food, but not necessarily wet proprietary food
    - Digestibility varies depending on the nutrient
  - Improved palatability:
    - Food with a greater moisture content will be more palatable to some dogs and high protein is more palatable for cats. This may be an advantage for picky eaters, but could be a disadvantage for pets prone to obesity.

Proponents of raw diets also report the following advantages from their experience:

Diet claim	Available evidence
'Natural' food is fed and this may be better for the pet	■ Guidance for the term 'natural' is that it must be obtained exclusively (or at least 95%) from the source material (e.g. of vegetable or animal origin). This is not an official or regulated definition ■ Therefore, depending on the ingredients used, commercially manufactured diets can also be defined as 'natural' in accordance with the above guidance
More appropriate for dogs. As wolves are similar to dogs, the sort of diet that they consume is thought to be more appropriate for dogs than processed kibble or canned food	■ Studies have shown that, over the many years of dog domestication, their dietary needs have changed and they have adapted their digestive capabilities to live as companions. The typical lifespan of wolves is shorter than that of domesticated dogs and, although many factors are responsible for mortality in wolves and dogs, this evidence is not consistent with a significant benefit for raw food over proprietary food. Therefore, further work is required before any perceived advantages of a so-called 'ancestral diet' can be clarified
Does not contain carbohydrate/ gluten/wheat: ■ Carbohydrates are thought not to be digestible and may even be harmful to pets ■ Carbohydrates are thought to be responsible for dietary intolerances	■ Unlike wolves, domesticated dogs can readily digest carbohydrates: indeed, 10 of the 36 genomic differences between these species are involved in carbohydrate digestion ■ Studies have shown that cats can also utilize carbohydrates, but to a lesser extent than dogs ■ True dietary intolerances are rare and generally assumed to be related to the protein part of the diet rather than the carbohydrate part of the diet

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Diet claim	Available evidence
Reduced occurrence of gastrointestinal signs	■ There is no published scientific evidence for this claim
Improved protein digestibility	■ True for some but not all proteins. If raw egg is given, the protein portion (avidin) within the egg binds to the amino acid (protein) biotin in the other food portions, making the proteins in the diet unavailable and therefore much **less** digestible
Improved stool volume due to feeding a diet without perceived 'fillers'	■ No scientific study evidence ■ The smaller stool volume in pets fed raw diets may be due to the lower fibre content ■ There are no such thing as 'fillers' in pet foods. Fillers are thought to be the low-quality ingredients listed as carbohydrate or starch sources in pet foods. They have also been described as 'cereal' or even as the 'sawdust content' of proprietary foods. It is thought that other than acting as a 'bulking' agent, they offer little or no nutritional benefit and, in some cases, may even cause harm. It is also thought that they cause dilution of the nutrition within the diets and are present only to bring costs down. There is no scientific evidence of this. There is, however, evidence that carbohydrate sources can deliver nutrients that can be easily utilized by dogs and cats and form part of a nutritious diet, rather than being a useless component
Improved stool quality	■ No scientific study evidence, although stool volume is often less due to raw diets typically having a lower fibre content
Improved breath odour	■ No scientific study evidence
Reduced risk of obesity	■ No scientific study evidence ■ 65% of dogs in the UK are either overweight or have obesity. There has been a limited number of studies looking at the associations between obesity and diet type, but thus far results have been inconsistent and variable. Further work is therefore needed in order to determine the associations between diet type and obesity in cats and dogs ■ Dogs prefer a higher fat and higher protein diet and, if this is fed *ad libitum*, dogs will overconsume and gain weight
Reduced hair shedding	■ No scientific study evidence
Eliminated gas or bloat risk	■ The suggested mechanism is that raw diets contain a decreased content of soluble and insoluble carbohydrate. While such a mechanism is plausible, there is currently no published evidence to support it
Fewer food allergies and reduced skin complaints	■ No scientific study evidence; anecdotal evidence only. Switching to a raw diet might plausibly resolve signs of an adverse reaction to food, provided that the component associated with the clinical signs is eliminated
Reduced pancreatitis incidence	■ No scientific study evidence
Prevents parasites	■ No scientific study evidence
Lower veterinary costs overall	■ No scientific study evidence
Improved recovery from illness	■ No scientific study evidence ■ Nutrition should be tailored to the illness and a raw diet might not be appropriate for conditions such as kidney disease, where phosphorus restriction is important
Reduced body odour	■ No scientific study evidence
Reduced faecal odour	■ Raw diets may reduce flatulence. This is thought to be due to having typically less fermentable fibre in a raw diet ■ Fermentable fibre in the diet produces short-chain fatty acids in the large intestine (gut). Given that raw diets contain less fermentable fibre, this may result in decreased short-chain fatty acid production. This may be detrimental to the pet because short-chain fatty acids are essential for large intestinal health
Increased energy levels	■ No scientific study evidence
Improved behaviour	■ No scientific study evidence
Improved immunity	■ No scientific study evidence

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Diet claim	Available evidence
The same diet can be fed at all life stages	■ No scientific study evidence. Furthermore, some commercial producers of raw diets make different products for different life stages ■ Homemade biologically appropriate raw food (BARF)-type diets are advertised as 'all-life' products. This implies that the recipe is suitable for young, old, pregnant, lactating, healthy or sick individuals. However, this is not necessarily advisable and any recipe should be formulated for the life stage of the pet, ideally by an appropriately qualified individual
Fewer trips to the veterinary practice	■ No scientific study evidence
Increased mobility for older pets	■ No scientific study evidence

Overall, there is little evidence for many of the claims made, meaning further studies are required.

What are the disadvantages of feeding raw diets?

Risk of multidrug-resistant bacteria

- Associated risks are to:
  - The pet
  - The owners and their extended family – especially young, old and immunosuppressed individuals
  - Veterinary and hospital staff.
- Multidrug-resistant bacteria of particular concern include:
  - *Escherichia coli (E. coli)*
  - Meticillin–resistant *Staphylococcus pseudintermedius* (MRSP).

Risk of pathogenic infection

Pathogen type	Available evidence
Salmonella spp.	■ Between 4% and 10% of chicken produced and sold in the UK for human consumption carries *Salmonella* species ■ Many studies have confirmed the transmission of *Salmonella* to pets in the contaminated meats that they are fed ■ Simple cleaning of food bowls at home with soap and water or in a dishwasher is not sufficient to eliminate this pathogen ■ Although uncommon, cases of zoonotic infection of *Salmonella* to pet owners have been linked to feeding a raw diet to the family pet ■ Most pets that become infected with *Salmonella* species become asymptomatic carriers (show no sign of infection), but studies have shown that they will still shed the bacteria in their saliva and faeces for 7 days after each infectious incident
E. coli	■ This pathogen was found in 60% of raw diets tested – both home-made and commercially produced ■ Human deaths have been reported from handling raw dog food contaminated with *E. coli*
Clostridium spp.	■ Although the pathogenic nature of *Clostridium* spp. remains unclear, 20% of commercially produced raw diets were found to carry these bacteria
Campylobacter jejuni	■ This pathogen is present in 50–70% of all chicken sold for human consumption in the UK ■ Acute polyradiculoneuritis in dogs (a neurological disorder) is thought to be triggered by pathogenic infection of *Campylobacter* deriving from contaminated food fed to pets
Toxoplasma gondii spp.	■ This pathogen is especially dangerous for pregnant women (as it causes fetal abnormalities) and for immunosuppressed individuals ■ Women are advised to avoid direct contact with their cat's faeces and litter tray (as this is where the spread of the pathogen is most likely) during pregnancy ■ As the prevalence of *Toxoplasma* in cats is greater when fed a raw diet, this should be given further consideration if living with at-risk individuals
Listeria spp.	■ This pathogen is widely found in meat products sold for human consumption in the UK. Raw food products have been withdrawn for containing dangerous levels of this pathogen
Mycobacterium bovis	■ Found in uncooked commercially manufactured raw cat food

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Pathogen type	Available evidence
Other pathogens found in raw diets include: ■ *Yersinia enterocolitica* ■ *Tuberculosis* ■ *Tularaemia* ■ *Echinococcus multilocularis*	All pose a health risk to all groups of people having contact with the pet

Concerns regarding the risks of pathogenic infection from raw diets have been frequently raised. A recent online survey taking a closer look at pet owners' perceptions of feeding raw diets and the incidence of infection, has suggested that the risks appear to be low, although **not negligible**.

Facts about pathogens

- Although not common, cases of pets suffering with *Salmonella* and other pathogens have been reported.
- Risks to owners arise not only from the handling of uncooked food, but also from handling the pet – namely, contact with the pet's saliva, fur, urine and faeces are points of concern. Pathogens are shed by the pet during urination and defecation. During grooming, the pet may spread pathogens to their coat via their saliva.
- Pathogens may also be shed asymptomatically into the environment where the pet lives or has contact with, which might be a further source of spread.
- 21–48% of home-prepared and commercially produced raw diets tested were found to have pathogenic contamination.
- Freezing does not eliminate all pathogens that may be harmful. For example, it does decrease *Campylobacter* colony counts, but will not eradicate completely *Campylobacter* or other pathogens. **The freezing of pet foods does not guarantee food safety**, as is commonly thought.
- High hydrostatic pressure processing or high-pressure pasteurization is a process used by some commercial producers to reduce pathogen risk. However, it does not completely eradicate all pathogens and is thought that it may lead to pathogenic resistance.
- Some proponents of raw feeding argue that contamination of pet food with pathogens is more common with conventional commercial foods (e.g. dry kibble, wet food), which are cooked. While this might be correct when examining the absolute number of pet food withdrawals, this is because such foods are much more commonly fed. Relatively speaking, many more withdrawals come from raw-food manufacturers.
- **Based on available evidence, the risk of pathogenic infection should be considered when recommending a raw diet. Arguably, the potential risk to human health may be more of a concern than the risk to dogs and cats consuming raw diets. The prevalence of such infections is unknown, as it is not frequently reported, or in some cases the cause may not be associated with the pet or its food. Therefore, if you who wish to feed a raw diet to your pet, you are strongly advised to take adequate precautions to reduce this risk.**

Potential concerns from specific ingredients

Although known to be rare, there are some potential risks associated with specific types of food.

- Raw egg – contains avidin, which binds to the amino acid biotin making it unavailable to be used as a protein source by the pet. This may result in protein deficiency.
- Raw fish (e.g. sea bream) or raw shellfish (e.g. scallops) – contains thiaminase, which destroys thiamine (an amino acid) causing protein deficiency.
- Liver – fed in large quantities can cause hypervitaminosis A, due to the large amounts of vitamin A stored in liver tissue.
- Trachea or gullet – if fed can cause hyperthyroidism, as the thyroid gland is often also consumed.

Excess or deficiency

- When feeding a raw diet, especially if preparing it at home, it is difficult for you to ensure that what you are feeding is a complete and balanced diet for your pet.
- Research looking to determine nutritional adequacy of home-prepared foods, both cooked and uncooked, has found some concerning results:
  - In one study where 95 different raw diets were examined:
    - 60% had a significant imbalance
    - 40% had a minor imbalance or were balanced
  - In two similar studies examining 94 commonly available recipes for home-prepared diets (both cooked and uncooked) for pets with medical conditions all were found to be inadequate
  - In a further study of 200 different recipes for maintenance diets, 95% were deficient in at least one essential nutrient, and 84% had multiple deficiencies.
- Clinical signs associated with conditions that are caused by feeding an unbalanced diet can take a considerable period of time to appear. At this point the damage may be irreversible.
  - Deficiencies of certain nutrients includes low calcium in the diet:
    - Occurs when an all-meat, table-scrap or all organ-meat diet is fed
    - These diets, being very low in calcium, cause hypocalcaemia resulting in **nutritional secondary hyperparathyroidism**. This is a very painful condition leading to significant bone loss through demineralization and multiple pathological bone fractures.

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- Although there are no published studies on prevalence, the risk of obvious nutrient deficiencies in adult dogs and cats appears to be rare. However, such deficiencies are more frequently reported in growing animals. As a result, caution should be exercised when feeding such diets to animals that have not yet reached maturity.

Sticking to the instructions (compliance)

- As with any diet, compliance with feeding instructions is essential.
- As it is harder to balance a raw diet, the margin for error may be reduced.
- Arguably, the greatest concern comes from home-prepared raw diets, as the recipes are often unbalanced to begin with.

Can raw diets provide balanced nutrition?

Yes, provided that the recipe has been designed, overseen or approved by an appropriately qualified person.

What safety measures are recommended to ensure that raw diets are fed responsibly?

Excellent hygiene

Taking excellent hygiene precautions is essential for the safe feeding of raw diets. They should include the following:

- At purchase, inspect the ingredient packaging for damage or contamination. If damaged, the ingredient should not be purchased or should be discarded. Damaged products should not be fed to your pet
- Hand washing should commence:
  - After food preparation
  - After touching the pet
- Preparation areas and surfaces should be cleaned with disinfectant immediately after food is prepared
- Clean food bowls should be used for each meal
- Bowls, floors and utensils should be disinfected immediately after feeding has finished
- Bowls or plates for pet use should be kept separate from the ones you use. Washing of bowls and plates alone is not enough to eliminate bacteria such as *Salmonella*
- Correct storage of foods will reduce the cross-contamination risk:
  - Any uncooked meats should be refrigerated in a sealed container
  - Uncooked meats should be stored away from human food (i.e. at the bottom of the refrigerator or, ideally, in a separate refrigerator – although this does not appear to be a contributing factor to the incidence of infection according to a recent study)
- Care is needed when handling pets and areas that the pet has contact with, especially areas used for toileting:
  - Studies have shown that pets infected with pathogenic bacteria can shed them into the environment. Therefore, the following precautions should be observed:
    - Wear gloves or wash hands immediately after any handling or contact with urine or faeces
    - Swift disinfection of areas within the home where inappropriate toileting has occurred
    - Fastidious clearing or cleaning of toileting areas within the garden
    - High general levels of environmental cleanliness and regular washing of bedding are advised, although further work is needed to ascertain whether washing would be sufficient for pathogen removal
    - Consideration should also be given to taking dogs to public areas, which may be difficult or impossible to clean (i.e. should these dogs be prevented for eliminating in public areas?).

How to defrost frozen uncooked food safely

- Defrost uncooked foods in sealed containers or in your pet's bowl, ensuring that it is covered.
- Defrost uncooked foods on the bottom shelf of the refrigerator (ideally in a refrigerator that is separate from that storing food for human consumption).
- **Do not** refreeze thawed uncooked foods.
- Thaw juice will contain nutrients and should not be discarded but fed to your pet in the meal.
- Further storage of defrosted food must be in a sealed container and refrigerated.

Method of feeding

Due to its high moisture content and potential for pathogenic contamination, it is not advisable to feed raw diets on an *ad libitum* basis. As with any food, an appropriate daily ration should be fed in meals, with uneaten food being removed after 30 minutes, disposed of and never reoffered to your pet.

Monitoring

It has been suggested that pets fed a raw diet should have regular tests to screen for nutrient deficiency. Adults should be tested every 6 to 12 months.

Considerations for feeding raw diets in healthy dogs and cats

- Dietary requirements can vary greatly between the different life stages and, arguably, no one diet will provide optimal nutrition for all stages.
- It is strongly advised to seek the advice of an appropriately qualified person before feeding a raw diet to growing animals. This is likely the life stage where ideal nutrition is most critical.

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Considerations for feeding raw diets in dogs and cats with various diseases

Many different diseases have specific nutritional requirements, meaning that a raw diet may not be appropriate in such circumstances. For example:

- **Chronic kidney disease (CKD):**
  - CKD requires a diet with restricted phosphorus content, while protein restriction should be considered at later stages. This is extremely difficult to achieve with a raw diet, since protein and phosphorus content can be very high
- **Obesity:**
  - Behavioural research indicates that dogs rarely regulate their food intake and will commonly overeat, especially when offered foods they find palatable. The greater fat and protein content of raw diets may mean such diets are overconsumed if fed *ad libitum*, leading to unwanted weight gain. While some cats will regulate their own intake, typically they consume more when fed higher protein diets
  - To avoid this, measured amounts of food, weighed carefully daily, should be fed
  - Regular monitoring of bodyweight is also essential to prevent obesity. Cats and dogs should be weighed every 2 weeks when transitioning to a new diet, with food intake adjusted until bodyweight is stable. They should then be weighed regularly thereafter (e.g. at least every 6 months to identify animals at risk of gradual weight gain)
- Immune compromise:
  - Pets that may be immunocompromised include those with neoplasia and hyperadrenocorticism, as well as those being treated with corticosteroids.

Raw diets in a veterinary hospital

If your pet is hospitalized, it is **very important that you notify the veterinary surgeon if you are feeding your pet a raw diet**, as this could have an impact on the hospital. Many large hospitals and referral centres have adopted rules that will not allow you to take in raw foods for your pet, and it is extremely unlikely that the hospital will feed a raw diet to your pet during their stay. This is to reduce the risks to other patients and hospital staff from pathogenic infection.

As pets can shed pathogens for 7 days after eating contaminated products, your pet may be housed separately to avoid pathogen spread to other patients within the hospital, particularly those who are very young or who are immunosuppressed.

Conclusion

The feeding of raw diets has become increasingly popular in recent years. Therefore, it is important that you consider all the pros and cons when making decisions about what to feed your pet, no matter the diet type. Decisions will be made 'on balance' for your individual pet. Provided assurance of nutritional adequacy is confirmed and sufficiently high levels of hygiene are met, raw diets can be safely fed. If you are in any doubt, please seek advice from your veterinary practice.

Last updated
April 2020

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