

## CPD article

# Crate confinement of dogs following orthopaedic surgery. Part 2: practical recovery area considerations

The recovery crate continues to be a useful part of the home care plan for smaller dogs following orthopaedic surgery. However, small, barren or uncomfortable crates are inappropriate. The crate must offer sufficient space for the patient to lie fully-stretched out, to sit or stand facing in a choice of directions, to turn easily, to eat, and to lick or chew at toys. Open-topped pens should be considered for patients that will not attempt to escape, as these tend to offer more floor area than crates. For larger dogs, a single-level recovery room is a suitable alternative to the crate or pen. This article discusses optimal set-up of crate and recovery room, including size, positioning, flooring, bedding, and methods of enrichment. Confined dogs benefit from a regular routine including controlled exercise, rest, feeding and human interaction. To avoid distress, the dog should be introduced to the crate or recovery room both gradually and preoperatively if at all possible. Owners require clear preoperative advice on the correct size, set-up and use of the recovery space.

10.12968/coan.2017.22.10.000

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**Key words:** postoperative care | animal welfare | dogs | orthopaedics | canine

This article follows on from the first in this two-part series (Dorn, 2017c) in which the reasons for confining dogs post-operatively, and the drawbacks of doing so, were discussed. Healing tissues and implants are susceptible to damage if subjected to high mechanical forces. In most cases following orthopaedic surgery, dogs must therefore not run or jump during early recovery, and must avoid boisterous play, stairs and slick floors. Whenever off-lead, these patients need careful confinement, typically for at least six weeks post-operatively.

Between periods of controlled exercise and dog-owner interaction, a crate, indoor pen or suitable room may be used to control patient activity. However, unaccustomed confinement has the potential to cause unacceptable distress in dogs, especially if the patient is left unattended for long or if the crate or recovery room is uncomfortable (Dorn, 2017c). This second paper discusses optimal set-up of the canine recovery space, with a focus on minimising patient anxiety and encouraging owner compliance.

There are as yet no experimental studies on the behaviour and well-being of exercise-restricted dogs following orthopaedic surgery. Evidence has therefore been extrapolated from dogs studied in other situations, especially in laboratory and rehoming kennels.

## Improvement of the crate environment

### Structure of the crate

Crates must be sturdy and non-chewable with no dangerous projections. Heavy-gauge wire crates are usually chosen because they are durable; hygienic; provide good ventilation; are available in various sizes; and enable a good view through all sides of the crate so that the patient can see out and allowing easy observation of the dog.

Both closed-topped crates and open-topped pens are available. Pens tend to be easier to use, as the handler can step inside the structure to retrieve their dog rather than bending and reaching into a crate. Furthermore, a pen looks less obtrusive within the home environment than a crate of similar floor-coverage and, especially when full recovery is expected to take months, this may encourage owner compliance. Owners are usually aware of whether their dog respects barriers, or is likely to try to barge through, jump up at, or jump over them. These issues should be discussed with the owner when choosing between a crate or pen. If there is any possibility that the dog may attempt to escape from a pen, then of course a closed-topped crate becomes the only option.

The entrance of most crates and pens has a raised 'lip'. Depending on the height of the lip, length of the patient's legs, and comfortable range of movement of the operated limb, this

may form a significant obstacle for the dog entering or leaving the crate/pen. The owner should be asked either to lift their dog in and out, or to use harness and lead restraint to ensure that the dog steps over the lip slowly and carefully.

### Size of the recovery space

The crate, pen or room should generally be just small enough to prevent the patient from running while still providing sufficient room for comfort. As discussed in the first paper of this series (Dorn, 2017c), long periods of inactivity will contribute to generalised muscle wasting and may result in weakening of both operated and previously-healthy tissues.

Sufficient crate height and floor area should be provided for each of the following:

1. **Moving between the natural postures.** Dogs require space to stand), sit (*Figure 1*), lie fully-stretched out and move unhindered between these positions. Postural freedom is considered a basic welfare necessity: regarding welfare of farm animals, the Brambell Report stated 'an animal should at least have sufficient freedom of movement to be able without difficulty to turn round, groom itself, get up, lie down and stretch its limbs' (Brambell, 1965) — guidelines that are also relevant to dogs. Space to adopt the main postures is particularly important following orthopaedic surgery, as being forced to lie continuously in a tightly-curved position may be uncomfortable and contribute to stiffness on rising. Awkward resting postures cause discomfort due to nerve compression and muscle shortening (Novak and Mackinnon, 1997). Maintaining limbs in a flexed position for long periods may also lead to long-term reduction in range of movement across one or more joints (Trudel and Uthoff, 2000; Clavet et al, 2008). Turning within a tight space and settling into a comfortable resting position are both expected to be more difficult for injured or operated than for healthy dogs, so ample space should be provided for patients to move from one position to another.
2. **Eating and drinking.** Drinking water must be available within the crate at all times. Meals should be fed within the crate to prevent running, jumping and skidding on smooth floors during mealtimes, for example in response to the doorbell. Furthermore, the patient is likely to accept the crate more readily if food is offered within it (*Figure 2*).
3. **Stretching.** Dogs put their bodies through systematic coordinated stretching movements (pandiculation), especially on rising from sleep. Animals only stretch in this way when given sufficient space (Fraser, 1989). Pandiculation is likely to benefit recovery by putting joints through their range of motion, adjusting muscle tone and improving emotional well-being.
4. **Two or more separate but continuous zones, e.g. for sleeping and standing.** An essential feature of good enclosures is that the animal has some control over its own environment (Sambrook and Buchanan-Smith, 1997). Increasing the complexity of a kennel helps to achieve this e.g. by division of the space into different regions such as a hiding place, a raised platform and an outdoor zone, thus



*Figure 1. Any recovery crate must offer sufficient headspace for the dog to sit upright.*



*Figure 2. The dog should be offered food, water and toys within their crate or pen.*

enabling the dog to choose where to sit, stand or lie (Taylor and Mills, 2007). A raised platform is of course inappropriate postoperatively, but consideration should be given to providing sufficient space for simple floor-level environmental choice(s) within the crate, which may include, for example:

- Sleeping and standing areas, each with different types of bedding (*Figure 3*)
  - Covered and open zones
  - Warmer and cooler zones, with one end of the crate positioned closer to a heat source
- Dog crates are available in standard sizes up to '48in'



Figure 3. Recovery pen with separate zones for sleeping and standing.

(approximately 123 cm long x 77 cm wide x 82 cm high), with specialist giant crates measuring up to 137 cm long x 84 cm wide x 107 cm tall. Crates are relatively narrow, making it difficult for large or long-bodied dogs to stand or lie facing the long side of the crate. Dog pens are readily available with floor area up to 160 cm x 160 cm.

In order to estimate space allowances for confined patients, measurements have been taken from dogs of various breeds in sitting, standing and lying positions (Table 1). Not all individuals were relaxed enough to lie with their limbs extended during measurement, leading to a broad range of values for space occupied by dogs in lateral recumbency. Space allocation should be based on the highest values within this range, as dogs should

always have sufficient space to lie fully-extended, even if they only choose to adopt this position occasionally.

Suggested minimum floor area for various breeds has been estimated based on approximate space required for a single dog to lie in lateral recumbency on soft bedding, and then to stand within an adjacent area. Headspace must be at least sufficient for the dog to stand and sit comfortably.

### Position of the crate in the home

The crate must be positioned so as not to become uncomfortable at any time of the day or night. Draughts, direct sunlight, and sources of intense noise, heat or vibration (e.g. washing machine, television or radiator) should be avoided, as these could become unpleasant stimuli.

Optimal crate position probably varies between individual dogs. Owners should be open-minded about positioning their confined animal in a busy or quiet area of the home, and be prepared to trial more than one location. Some dogs prefer to see, hear and smell family members, visitors and other pets around their crate, whereas this may over-stimulate other patients.

It may sometimes be possible to move a crate or pen around the house, and even take it outdoors for periods (Figure 4).

### Flooring and bedding

Unsteady footing alarms some dogs and discourages quiet standing, so owners should be instructed to remove or replace the crate's base tray if it wobbles.

Rubber-backed matting will provide traction and should be placed over the entire floor of the crate or pen as a base layer. This optimises safe use of the operated limb while standing, turning and walking (Doyle, 2004).

Soft bedding increases comfort, provides thermal insulation, and may encourage rest. Sufficient cushioned bedding should be placed on top of the matting to offer an ample area for the dog to lie stretched out. To reduce draughts, a cot bumper or additional blankets may be placed around or over the crate if necessary, especially at night.

Inclusion of items familiar to the dog, such as its usual blankets or towels, may offer comfort in the new restricted environment. The animal's familiar bed may be placed within the crate if there is sufficient space. If raised sides of the dog's usual bed are too high to step over during recovery, then a flat piece of padding should be used instead.

Adjacent to the bedding, in the standing area of the crate, a layer of deep-pile material such as vet bed encourages optimal use of postural muscles during standing and slow walking. Such muscle activation is likely to benefit recovery, especially following cranial cruciate ligament (Adrian, 2009) or patellar surgery. Unless rubber-backed, such materials should only be used if placed directly onto a non-slip surface.

### Environmental enrichment for the confined patient

When dogs are being restricted from their normal activities and environmental exploration, it is important to provide alternative forms of environmental enrichment.

**Table 1. Measurements of dogs (cm) and suggested minimum floor space allowance during recovery**

Breed	Number of dogs measured	Height of sitting dog (cm)	Length of standing dog (cm)	Length of lying dog (cm)	Width of lying dog (cm)	Minimum floor area of recovery crate or pen (cm)
Basset Hound	5	46 (42–52)	91 (86–99)	96.2 (86–103)	45 (42–52)	115 x 140
Border Collie	3	71 (64–75)	88 (83–91)	95 (88–99)	57 (53–59)	110 x 145
Border Terrier	2	39.5 (37–42)	65 (57–73)	66 (59–73)	36 (34–38)	80 x 105
Cavalier King Charles Spaniel	8	47 (40–54)	67 (53–82)	75 (61–88)	41 (38–44)	95 x 115
Dachshund, miniature smooth	9	31 (28–33)	53 (48–61)	54 (49–58)	20 (16–25)	70 x 90
Dachshund, standard wire-haired	4	43 (35–47)	77 (79–89)	76 (65–92)	38 (32–52)	100 x 140
Greyhound	2	73 (70–76)	105.5 (105–106)	103.5 (89–118)	70 (68–72)	135 x 185
Japanese Chin	4	36 (34–37)	50 (43–61)	58 (50–62)	38 (31–43)	70 x 100
Labrador	11	78 (66–90)	96 (81–131)	105 (90–129)	72 (61–80)	135 x 180
Pug	4	45 (42–50)	52 (49–54)	58 (53–61)	38 (33–42)	70 x 100
Springer Spaniel (English)	2	66 (63.5–69)	78.5 (71–86)	93 (82–104)	57 (55–59)	110 x 140

Mean measurements are supplied, with the range of values shown in brackets. Information on how the dogs were measured is provided at <http://therehabvet.com/2017/05/obtaining-measurements-of-dogs/> (Dorn, 2017b)

## Toys

Canine 'toys' include various items that are designed to provide interest, such as chews, interactive food-dispensers, squeaky toys and balls.

Studies on kennelled dogs have shown that toys can encourage focused activity such as chewing, and reduce stereotypical pacing and barking (Hubrecht, 1993; Wells, 2004; Schipper et al, 2008). For exercise-restricted dogs, interaction with toys may help to alleviate boredom and provide a positive outlet for physical energy. However, toys may be ignored if introduced indiscriminately (Wells and Hepper, 1992; 2000), and dogs may lose interest in toys over time (Wells, 2004).

The extent to which toys relieve boredom likely depends on the dog's age, breed and previous experience (Taylor and Mills, 2007). Comparison between studies suggests that the daily proportion of time spent playing with toys is high in puppies, moderate in 6–9-month-old dogs, and lower in adult dogs (Taylor and Mills, 2007).

Chewable or noisy toys tend to stimulate more interest than robust toys (Pullen et al, 2010). However, noisy toys are contraindicated during recovery if they initiate exuberant activity. Possible risks of accidental ingestion (Gianella et al, 2009) or inhalation must also be considered.

Animals may prefer to work for food ('contra-free-loading') rather than eating the identical ration ad libitum (Osborne, 1977; Sambrook and Buchanan-Smith, 1997; Young, 1997). Many dogs certainly appear to enjoy using food-dispensing toys such as rolling ball dispensers, puzzle feeders that release kibble when moved in a specific way, and hollow chew-toys such as Kongs™



Figure 4. This Cavalier King Charles Spaniel made an excellent recovery from tibial plateau levelling osteotomy in an indoor pen that was moved outdoors now and again in good weather. She is shown here at five weeks after surgery.



Figure 5. Toys such as this food-filled Kong™ help to alleviate boredom in confined dogs.

(Figure 5). These items increase the proportion of time engaged in positive behaviours including foraging, exploring and chewing, as demonstrated in a small study on beagles given filled Kongs™ (Schipper et al, 2008).

Bouncy toys must be avoided postoperatively in order to discourage chasing and leaping. In some cases, food-dispenser balls are also inappropriate, because they require the dog to walk with a low head-carriage. Following stifle surgery, this nose-to-the-ground posture facilitates reduced weight-bearing of the operated limb and may encourage development of a chronic compensatory gait pattern.

Owners should be advised to observe their dog for a while with each new toy to ensure suitability. Individuals that tend to toss and

chase objects will need careful toy selection.

Practical suggestions regarding toy selection and use are provided in *Box 1*.

### Olfactory stimulation

Maintaining familiar odours in and around the crate (e.g. those associated with the dog's usual bedding) is expected to have a positive emotional effect on the patient.

Dog appeasing pheromone (DAP) has been reported to reduce canine anxiety in various situations, including in the veterinary waiting room (Mills et al, 2005), for dogs in hospital cages (Kim et al, 2010) at home during fireworks (Shepherd and Mills, 2003) and in a canine rescue centre (Tod et al, 2005). A 2010 systematic review of canine and feline pheromone efficacy (Frank et al, 2010) questioned the quality of most available studies, and noted that there was at that stage very limited evidence supporting the use of DAP in managing canine behaviour. However, with no known side-effects, it is reasonable to suggest to owners that they fit a DAP (Adaptil™) plug-in diffuser immediately adjacent to the crate as part of a strategy to reduce their dog's anxiety during cage restriction. DAP spray may additionally be applied to the dog's bedding.

### Auditory stimulation

Dogs in rescue kennels spent significantly more time resting and showed fewer signs of stress while listening to recorded classical music (Wells et al, 2002; Bowman et al, 2015) soft rock or reggae music (Bowman et al, 2017) or an audiobook aimed at older children (Brayley and Montrose, 2016). However, dogs appeared to habituate to the calming effects of a repeated music playlist as early as the second day of exposure (Bowman et al, 2017).

It can be suggested to owners of dogs in recovery crates that they leave recorded music, audiobooks or the radio playing at a volume similar to that of spoken conversation, as this may encourage the patient to rest. However, any benefit of recorded music or radio in the domestic setting may well depend on the previous experience and individual preference of the dog.

It must be remembered that caged dogs cannot escape from auditory stimuli that they find unpleasant, whether this is loud recorded music or noise from television or family games.

### Intraspecific contact

Dogs are social animals (Bradshaw and Rooney, 2016) and solitary confinement may increase anxiety, especially if the patient is used to regular close contact with other dogs in the house. However, the behavioural reactions of crate-confined dogs to other canine household members outside the crate is an area that has not yet been investigated.

Owners should be advised to observe the situation, and to remove other dogs from view at times if this becomes necessary, e.g. if the confined patient is showing signs of frustration or over-excitement.

### Feeding

Calorie requirements are not increased postoperatively (Walton et al, 1996), and any prescribed reduction in the level of exercise will predispose to weight gain. Owners should be advised on how

### Box 1. Practical suggestions for owners on the use of dog toys for exercise-restricted patients

- For safety:
  - Choose durable toys appropriate to the dog's size and chewing ability
  - To reduce risk of inhalation, avoid toys with squeakers or loose parts
  - Dispose of damaged or broken toys promptly.
  - Avoid balls and other bouncing toys
  - Rolling food-dispensers should generally be avoided until late in recovery
  - Observe the dog initially with each new toy to ensure that the dog interacts with it non-destructively and does not engage in throwing/chasing behaviour
- Durable chew toys and non-rolling food-dispensing devices are particularly appropriate
- Buy a variety of toys, and offer these to the dog in rotation to maintain interest
- If necessary, show the dog how to release kibble from the more complex puzzle-feeder devices during initial introduction
- Food offered as edible chews or within food-dispensing toys must not exceed the dog's usual nutritional ration

much to feed, including training rewards and any other 'extras'. This total forms the dog's daily ration, which should be measured out each day.

Some patients will enjoy receiving part or all of their daily ration from food-dispensing toys. Addition of high calorie treats or pastes (e.g. peanut butter) to the diet during recovery is contraindicated, as this will cause weight gain and possible digestive upset. Food used to fill toys must always be part of the dog's nutritional ration, e.g. kibble can be fed from puzzle-feeders; Kongs™ can be filled with dry or soaked kibble and sealed closed with a tinned dog food (*Figure 5*). For a longer-lasting challenge, filled Kongs™ can be frozen, then wiped over with a warm damp cloth before being offered to the dog.

### Safe restraint of the dog as it exits the crate

Owners must have their dog under close control as they open the crate door. The patient should either be lifted from the crate, or encouraged to step slowly out. In most cases, it is advisable to keep a well-fitting harness on the dog at all times. The top of the harness acts as a safety 'grab-handle' that the owner can hold as soon as the crate door is opened. A well-designed harness attaches around the dog's centre of gravity, and is therefore preferable to a collar or slip-lead as a means of steadying or supporting a weak or painful dog.

Flooring between crate and outdoor toilet area should be non-slip: carpet is ideal. Rubber-backed matting should be placed if the floor is slick.

### Introducing the dog to the crate

The patient should be introduced to the crate gradually and, if



*Figure 6a. Many pets are accustomed to sleeping on furniture, a habit that can be difficult to break during recovery.*



*Figure 6b. Access to sofas must be prevented during recovery.*

possible, pre-operatively. Dogs readily form negative associations with new places and procedures (Rooney et al, 2009), and fear induced during initial crate-introduction may have long-lasting negative behavioural effects. Manhandling the patient into the crate and then slamming the door closed is expected to cause distress.

Owners should be advised to maintain a positive behavioural approach throughout crate-introduction. All positive and relaxed behaviour should be immediately rewarded with verbal praise and/or food rewards. In Labrador Retrievers, gradual introduction

to a kennel environment using positive rewards resulted in less stress than sudden kennelling (Rooney et al, 2007), an approach that can be usefully extrapolated to dogs during introduction to a recovery crate.

Punishment, or combinations of punishment and reward, lead to increased canine anxiety. This approach may cause both over-excitement and subsequent separation-related behavioural problems (Hiby et al, 2004). Training methods involving verbal or physical punishment must therefore be avoided throughout crate-introduction.

Like any potentially-stressful new experience, introduction to the crate should be broken down into small steps (Rooney et al, 2009), thus helping to prevent aversion. The number of steps and rate of progress will depend on the individual dog.

Before introduction, the crate must be set up comfortably with the door propped open. If the patient is considered safe to walk in and out of the crate unaided and off-lead, for example before some types of elective surgery, then the method summarised in *Box 2* is appropriate for crate introduction. This process may need adjusting depending on the patient's mobility, level of activity restriction and the time available. Further information is available at <http://therehabvet.com/2017/04/introducing-your-dog-to-the-recovery-crate/> (Dorn, 2017b).

### Daily routine of the crate-restricted patient

Dogs are expected to cope better if they have a regular routine (Rooney et al, 2009). Pleasant experiences such as feeding, grooming and lead-walking should therefore occur at predictable times of the day as far as is possible.

For many dogs, human interaction is the high point of the day, and solitary confinement within a crate or small room may cause distress. Owners must avoid leaving their crate-confined

dog alone for extended periods. Work commitments may require some owners to delegate some of the care of their recovering dog to other family members, friends or to a dog-sitter. Owners should organise this with care, as a consistent approach is particularly important when more than one handler is involved.

A typical day for a crate-restricted patient involves the following:

- Three to five outdoor sessions on harness and lead for toileting. Outdoor periods are initially very short (e.g. 5 minutes) but, over time, become lead-walks of increasing duration as appropriate to the individual case.
- One or more sessions of positive interaction with the owner or with other delegated handlers. Frequency of owner interaction depends on the personality and previous experience of the dog, and on time regularly available to the owner. Positive interaction may involve simply sitting together or grooming, quiet games (e.g. basic 'nose work' games on the lead), or the use of prescribed physiotherapy exercises, massage, etc.
- Two or more meals fed at regular times within the crate. Food is offered from a bowl or from refilled food-dispensing toys.
- One or more regular daytime resting periods during which the dog learns not to expect owner interaction
- Regular evening bedtime, after which the dog is left to sleep undisturbed in the crate.

### Medication to facilitate postoperative confinement

Analgesia is essential following orthopaedic surgery, may need to be multimodal, and should be based on pain assessment performed prior to discharge and at each recheck.

Heavy sedation to enable patient confinement, e.g. with acepromazine maleate, risks falls and unacceptable side-effects, and is therefore inappropriate during the weeks of recovery (Gruen et al, 2014). In rare cases in which heavy sedation must be considered due to imminent threat to the patient or handler, it is imperative to first ensure that the analgesia regime is appropriate and adequate. Pain may contribute to restlessness and to poor acceptance of crate-confinement. The dog's daily routine and set-up of the recovery area should also be checked for suitability.

Off-label use of the antidepressant trazodone may be considered as postoperative anxiolytic. In an uncontrolled prospective study, 90% of owners reported improved calmness and acceptance of confinement when trazodone was given to dogs over a period of at least 4 weeks during home recovery from orthopaedic surgery (Gruen et al, 2014). Trazodone has also been demonstrated to reduce signs of stress in hospitalised dogs and is generally well-tolerated (Gilbert-Gregory et al, 2016). Onset of action is within 90 minutes. Care must be taken to avoid drug interactions when using trazodone (Ramsey, 2014), and owners should be warned that trazodone may cause aggression in occasional dogs.

For dogs with behavioural issues, the benzodiazepine alprazolam could be considered for the first 24–48 hours of confinement, again off-label. Its anxiolytic and amnesic effects could potentially help prevent early aversion to the crate from developing, although there are as yet no canine studies to demonstrate its use in the postoperative period. A low test dose

### Box 2. Crate introduction process

- On first introducing the crate, ensure that it is already set up comfortably and that its base provides even footing. Food should be placed within the crate and the door propped wide open. Rolled towels or other visual guides may be placed strategically alongside the entrance to offer a clear route in
- Initially, allow the dog to sniff at the crate and to find its own way towards the food if mobile enough to do so. Keep the crate door wide open
- If the dog needs further encouragement to enter the crate, then the owner can gently roll pieces of kibble or higher-value food rewards into the crate. Movement of the food entices the patient to follow. The dog should be allowed to move in and out of the crate, and to explore the crate interior, again without closing the crate door
- Offer a filled food-dispensing toy such as a Kong inside the crate. This should encourage the dog to lie down and chew. Again, keep the door propped wide open
- Once the dog is confident both to eat and rest a little within the crate, the door can be gently closed with the dog inside for up to a few minutes. The door should first be closed while the dog is eating, and opened again before the food is finished
- Periods spent inside the closed crate are gradually increased over several days

would need to be given beforehand to ensure suitability of the drug (Overall, 2013), as alprazolam may cause ataxia or disinhibition in some individuals (Ramsey, 2014).

Drugs of the SSRI group (e.g. clomipramine hydrochloride or fluoxetine) have been used in confined dogs but, as it takes at least 4 weeks for these to take effect, they are rarely useful postoperatively.

### Room rest

For dogs too large to be restricted to a crate or pen, confinement to a small room is usually the most practical solution following orthopaedic surgery.

As with crate-confinement, the aims of room-confinement are to prevent jumping, stair access and running. Armchairs and similar items may need to be temporarily removed to prevent jumping (*Figure 6a and b*). Other household pets should generally be excluded from the room to prevent boisterous interaction.

Some dogs choose to stand on their hind legs, for example while looking out of the window with front paws placed on a windowsill. This poses some risk during early recovery from orthopaedic procedures. In order to discourage two-legged standing, the owner may need to choose a different room or to keep curtains drawn.

Further considerations are similar to those for crate-restricted dogs. Owners should be advised to cover any slick flooring with non-slip matting in order to provide traction (Doyle, 2004). Floor-level bedding should be draught-free and offer enough space for the dog to lie fully-stretched out, the comfort of rest areas being especially important while the dog is denied sofa-access. Toys should be chosen as for crate-restricted dogs.

Confinement to a utility room or similar area is sometimes considered, e.g. if the remainder of the home is open plan. However, dogs will feel less anxious within a room that is already part of their familiar living space. It is generally best to position the dog in a room that facilitates regular dog-owner interaction. Frequency of through-traffic, temperature, and noise from washing machines, etc. should be taken into account, and the

owner must of course prevent access to cupboards containing household cleaners and other hazardous items.

### Communicating with owners

Owners need clear instructions on the correct size, set-up and use of the crate, pen or recovery room. The author regularly encounters confinement-related problems that could have been prevented by timely advice (see *Table 2*). Misunderstandings between owner and client can occur due to:

- Insufficient time set aside for discussion
- Insufficient advice supplied on key issues (e.g. crate size, methods of restraint outside the crate)
- Owners failing to remember all that they had been told, especially if advice was mainly given during hospital discharge when the owner was focused on collecting their operated pet.

Verbal and written advice on crating or room rest is best given pre-operatively if possible, with opportunity for further discussion at time of hospital discharge. Pre-operative advice enables owners to buy appropriate equipment and to start crate introduction in good time.

### Conclusions

Restricting a dog to a crate, pen or room is challenging for most owners and requires advance planning. Attention to detail is key to patient comfort, welfare and safety during the recovery period. Important factors include method of introduction to the recovery space, floor area, headspace allowance, type of bedding, daily routine, use of toys, and appropriate restraint of the patient outside the recovery space. Recovery crates are only suitable for smaller breeds while pens, though only suitable for dogs that will not escape, tend to offer more floor space. Room rest is usually the best option for larger dogs. At the very least, recovering dogs need space to stretch and to move between natural postures.

Optimal size and shape of the canine recovery area deserves further investigation. Studies investigating how various breeds and age-groups of dogs behave within recovery crates in the home

**Table 2. Some mistakes encountered during canine post-operative confinement**

Error	Consequences
Crate too small	Patient distress. Muscle tightness in combination with prolonged lameness
Dog released from crate unrestrained, e.g. at feeding time or for toileting	Limb overuse with or without acute re-injury. N.B. placid-looking dogs can be surprisingly quick to run in response to the doorbell or other stimuli Or establishment of long term compensatory three-legged gait
Sudden introduction to crate or recovery room	Poor acceptance of the crate, distress, failure to settle. In some cases, owner abandons use of the crate
Crate or recovery room too draughty	Dog will not settle
Insufficient bedding offered	Dog will not settle
Crate has wobbly base	Dog nervous of entering crate Dog reluctant to stand quietly within crate during early recovery
Crate, pen or recovery room has slick flooring	Prolonged lameness Delayed recovery of standing posture
No suitable toys offered	Dog bored and will not settle
Room rest regime that allows the dog to jump onto sofa or bed	Limb overuse Re-injury due to falling or jumping from furniture

**KEY POINTS**

- Introduce the dog to the recovery crate gradually, using only positive reinforcement techniques.
- If the dog is too large to be confined to a crate or pen, then room-confinement is indicated.
- Confined dogs need sufficient space to sit, stand, lie and stretch, and to move easily between postures.
- Confined dogs need a regular routine including controlled exercise, rest, feeding and human interaction.
- Toys reduce boredom in confined dogs.
- Patients need safe restraint whenever outside the crate or recovery room.

environment would be useful, as would evidence-based guidelines quantifying safe levels of activity following specific orthopaedic procedures. **CA**

**Acknowledgements:** The author would like to thank Dr Sarah Heath, European Veterinary Specialist in Behavioural Medicine (Companion Animal), for discussion regarding behavioural aspects of canine confinement, and Louise Clark, RCVS and European Veterinary Specialist in Anaesthesia, for advice regarding medical options for managing crate-confined dogs.

**Conflict of interest:** No conflict of interest.

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