

# The ABC Manual

THE ANIMAL BIRTH CONTROL PROGRAMME

HELP IN SUFFERING, JAIPUR.

**A Report of the Background, Methods and Results of the Help in Suffering  
Animal Birth Control Programme.**

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## SUMMARY

The purpose of this Manual is to share the information that Help in Suffering Animal Shelter has accumulated over the past ten years of conducting its Animal Birth Control (ABC) Programme. The veterinary procedures, animal welfare issues and management protocols which we developed with the participation of many people, including volunteer veterinary surgeons from abroad, have been documented for the benefit of other shelters planning to run ABC programmes, and for the benefit of municipalities and governments who may wish to implement such programmes. We have proved through collation of statistical data on dog population dynamics that such a programme can be efficacious.

The Help in Suffering Animal Birth Control Programme was commenced in November 1994, although the planning phases were commenced at least nine months earlier. It was launched as a response to the unsuccessful attempts of the Jaipur Municipal Corporation to eradicate street dogs by poisoning. The street dogs bred rapidly again to fill the available biological niche provided by ample rubbish in the city. Our programme had two simple objectives: to stabilise (not eliminate) the street dog population and to control the spread of Rabies.

Initially we did not know if such a programme would be successful. We had, and continue to have, three principles to which we adhere; that we would treat all dogs passing through our programme with utmost care; that we would keep detailed records so that scientific information could be gathered about street dog population dynamics; and thirdly that we would be absolutely honest and exact in all the statistics we kept.

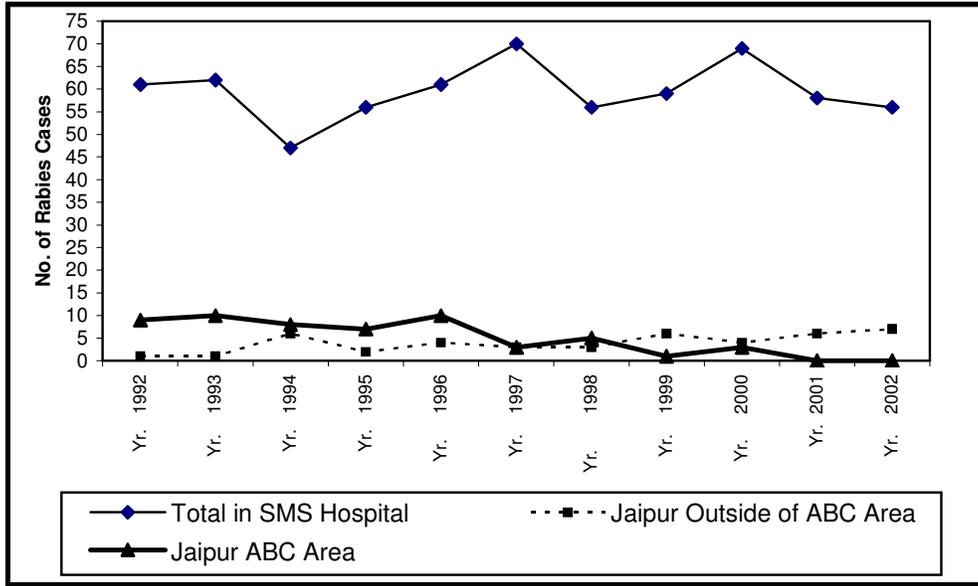
Initially our programme began as a trial in three discreet areas. We decided to do it in this way because we wanted to ensure that our protocol for handling dogs humanely was fully evolved before we expanded the number of dogs passing through the programme. The trial proved successful and we moved on to cover the whole of Jaipur, which we divided into arbitrary areas, working one area at a time.

Now, ten years later we are able to establish from our statistics that an ABC programme can achieve its objectives if a large enough number of bitches are sterilised and vaccinated every month. (In the case of the Help in Suffering programme this is an average of 295 dogs per month.)

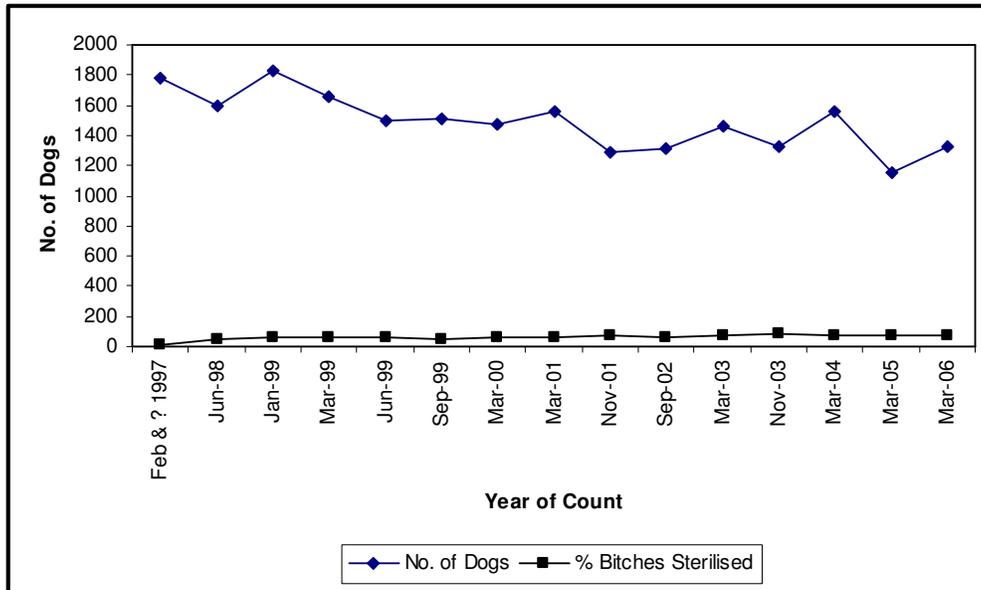
There have been no cases of human Rabies in Jaipur for the last four years despite the fact that previously there was a high incidence of cases (see graph below). Additionally our figures have shown that the dog population was initially reduced by about 28% (see graph below) and then has stabilised.

From this evidence we conclude that ABC programmes are an appropriate technology for a city where rubbish can not be eliminated, and that they are the only efficacious means of humanely controlling the street dog population.

Christine Townend  
Chairman of Trustees, Help in Suffering



Graph 1. The Decline in Human Rabies in Jaipur since the start of the ABC Programme



Graph 2. The Decline in Street Dog Population in Jaipur since the start of the ABC Programme.



## **BACKGROUND**

Jaipur is the capital city of Rajasthan with a human population of approximately 2.5 million (2001 census). It is called the Pink City because of the unique architecture and decoration. The rapidly expanding population of Jaipur means that the metropolitan region extends far outside the confines of the old walled city. Development is rapid and uncontrolled. The potential areas that may harbour a stray dog population are constantly expanding. The old methods of population control by strychnine poisoning or electrocution employed by the municipal corporations have not proved effective in controlling street dog populations, as new dogs soon migrate into areas where the local dog population has been killed, and rapidly begin to repopulate the areas. This increase in the movement of dogs also increased the possibility of the transmission of diseases such as rabies.

A recent World Health Organisation (WHO) funded report by the Association for the Control and Prevention of Rabies in India (APCRI) has calculated that about 20,000 Indians die of rabies every year. South Asia now accounts for half the known cases of rabies throughout the world. The street dog is the main vector of Rabies in India.

In 1990 the WHO and the World Society for the Protection of Animals (WSPA) collaborated on the publication of 'Guidelines for Dog Population Management', which proposed a new, long-term method for the control of urban dog populations in a more humane manner. The method advocated amongst other things a systematic sterilisation programme rather than the mass euthanasia programmes undertaken by Indian municipalities. In 1992 in a case taken out by Smt. Maneka Gandhi, the Delhi Court ordered that animal birth control (ABC) programmes should be substituted for the present ineffective and cruel killing methods. In 1993 WSPA approached Help in Suffering Animal Shelter, Jaipur, and proposed that the ABC methods should be scientifically tested by a pilot programme conducted in a discreet area of Jaipur with 1,500 bitches. The pilot programme commenced in September 1994 and concluded in September 1995. The results appeared to indicate that the methods employed were effective in the stabilisation of the urban dog population, and on this basis a decision was made to expand the spaying and rabies vaccination programme to cover the whole of Jaipur.

The protocol involves a system of monitoring and recording statistical data on the target population as recommended in the WSPA/ WHO Guidelines. It means that for the first time in India data on many aspects of the ecology and population dynamics of street dogs have been collected. At the time of writing there is considerable evidence to show the efficacy of the ABC programme in stabilising dog populations

Some of the results may not be quantifiable in terms of numbers, but are noticeable nonetheless. For instance there is a rapid decline in the number of unsupervised dogs that form packs and are real nuisance animals. Controlling reproduction seems to reduce the surplus of dogs and so recruitment to these 'packs' also falls.

### **Commencement of ABC Programmes in India**

In 1992, as a result of a case brought against the Municipal Corporation of Delhi by Smt. Maneka Gandhi, the Tees Hazari Court in New Delhi found that street dogs should not be killed in Delhi. The Animal Welfare Board of India (AWBI) had been advocating ABC programmes since the 1970's, but it now decided that it was important to promote seriously the programmes among Non Governmental

Organisations (NGOs). In 1994-5 it launched immunisation-cum-sterilisation programmes in Bombay (Mumbai), Delhi, Calcutta (Kolkata), Madras (Chennai), Bangalore and Hyderabad. The AWBI set out guidelines for these programmes. The Jaipur programme began in November 1994.

### **The HIS/ABC Programme**

In October 1993 WSPA representatives visited Help in Suffering (HIS) and proposed that HIS should manage and implement an ABC programme which WSPA would fund. The programme would be conducted according to the WSPA/WHO Guidelines for Dog Population Management. The aim of the programme would be to prove the principle that the mass sterilisation and vaccination of street dogs in selected areas of Jaipur would result in a smaller, healthier, friendly and rabies free street dog population.

Although there had been other ABC programmes in operation in India, none made statistical analysis of the street dog population dynamics. This was to be the crucial difference between HIS ABC programmes and other programmes.

### **Why Animal Birth Control?**

ABC programmes using the WSPA/WHO Guidelines for Dog Population Management provide an alternative to the mass euthanasia methods, of strychnine poisoning or electrocution, which are used by many municipalities in India.

The methods used by these municipalities to control the street dog population were ineffective as dogs quickly repopulated, by migration, areas which had been emptied only months before by poisoning or other methods.

It was not only the suffering of the individual dogs which was of concern, but the larger principle which WSPA's programme embraced in conjunction with the current policy of the Animal Welfare Board of India - namely, to find a humane and ethical means of controlling populations of animals without unnecessary euthanasia. It was important to demonstrate practically that humane street dog population control was feasible, thus encouraging other Developing Countries to implement similar programmes.

### **Why does the Municipality want to kill Street Dogs?**

The Municipality is under pressure from certain sectors of the community who see the dogs as a nuisance, are afraid of rabies, and therefore continually telephone and harass the officials with complaints about the dogs and the failure of the Municipality to take action.

Like any established and bureaucratic operation, where there are jobs at stake and where a whole infrastructure has been established to carry out a particular task, people are afraid that it will be seen as superfluous and funding sources will cease to flow.

### **Why Bitches? Why Not Male Dogs?**

Our programme concentrates on spaying bitches rather than castrating or vasectomising males.

One unsprayed female remaining in the population could give birth to as many as 20 pups a year (although our figures indicate a bitch is most likely to give birth to only one litter per year and that of only 6 pups). However, one unneutered male could mate with many females resulting in hundreds of extra puppies. A programme concentrating on males rather than females can be rendered completely ineffective if only a few males escape sterilisation whereas the same number of missed females will have a very limited effect.

Therefore a female-focussed programme is a more effective use of limited resources.

A female-focussed programme has the following additional benefits -

1. If there are fewer bitches in heat there is less aggression in male dogs in dispute over females.
2. Unneutered males can protect more effectively the territory of the group, reducing inward migration of dogs from outside possibly carrying rabies and other infectious diseases.
3. Spayed females are more able to maintain body condition on a limited food source as they are not supporting pregnancy and lactation.

In addition, we have found the post-operative complications of castration are more difficult to treat. Adult males are difficult to handle during post-operative treatment, particularly in cases of swelling, irritation and suture breakdown. Post-op care of the females is less intrusive and better tolerated by the bitches and thus safer for the staff.

### **Early Difficulties faced by HIS ABC Programme**

The innovative nature of the programme meant that we had to experiment and adapt to the local conditions as we proceeded. Major difficulties included:

- Failure to receive definite written commitments from government authorities that they would not capture or kill dogs in the areas where we were working.
- Having to negotiate with bureaucracies whose officials were frequently changing, corrupt and did not communicate between themselves.
- Lack of information regarding the number of street dogs and their behaviour (for example migration, breeding, territorial behaviour etc.).
- Extremes of climate, ranging from 5°C to 45°C.
- Infestation of screw worm fly and other insect vectors spreading disease.
- Non-availability of veterinary equipment such as sterility indicator tape for the autoclave, spay hooks and other basic requirements for good surgery.
- Staff who had no concept of such a programme and who were completely untrained.
- The necessity to catch street dogs that are wary of human contact in a humane manner.
- New techniques had to be developed for counting street dogs as they were not well reported in the scientific literature.

- Management within the shelter: a method had to be determined for recording data, each dog's origin, history and the responsibility of the staff.
- The status of health of the street dog population was unknown. If they were extremely debilitated high losses could occur post-operatively.
- Various other procedural questions had to be addressed, such as incentives to staff to catch dogs, suitable times for dog-catching etc. All these procedural matters required adjustments as time progressed because more information was collected on the behaviour of the street dogs.
- Welfare aspects, for example: how long should an operated bitch be held before release; should pups be caught when young or was it more humane to wait until they mature and should bitches be held if they produce a litter after capture.
- There were also questions related to financial resources and infrastructure available such as whether resources should be concentrated on spaying only females.
- The question of the most efficacious and long-lasting method of dog identification also needed to be addressed. Again, this was decided by trial and error under local conditions.
- The question of the rate at which bitches could be processed had to be determined, and the cost of each operation could only be assessed as the programme got underway.
- Difficulty in finding Indian veterinary surgeons skilled in spaying to participate in the programme.

### **Commencement of the Programme**

The HIS/WSPA Animal Birth Control programme was launched in November 1994 by Smt. Maneka Gandhi. It involved a pilot programme to take place over a period of two years in three areas of Jaipur, in which it was planned to catch, spay, vaccinate, identify and release an average of 15 dogs per week.

During the pilot programme the shelter spayed a total of 20 dogs per week and completed work in an additional fourth area within a period of thirteen months. The initial results were very encouraging.

In November 1995, Lt. Gen. A.K. Chatterjee, Chairman of the AWBI, expressed his wish that Jaipur could provide a model programme. This led to HIS approaching Animaux Secours (Arthaz, France) to request funding for doubling the programme with a target of spaying 50 dogs per week. The funding bodies agreed to this proposal, an additional 21 kennels were built with grants from the Animal Welfare Board of India and Animaux Secours, and the expanded programme commenced in early 1996.

### **Legal Challenges**

The HIS ABC programme faced several difficulties as regards co-operation from the Jaipur Municipal Corporation, but the major difficulty was the desire of the Municipal Corporation to re-commence the poisoning of street dogs.

The legislation which governs the responsibility of the Municipality with regard to the street dog populations is the Rajasthan Municipalities Act, 1959. The most relevant are section 208 - Provision as to Dogs; sections 209-215 - House Scavenging, etc.; sections 221 and 222 - Non-removal of Filth, etc. and section 232 - Prohibition of Other Nuisances, particularly sub-section (c). The act generally gives power to the municipality to act, rather than obligating them to act. Thus, action is taken at the discretion of the Municipality.

Although the Municipal Corporation had given an assurance that they would not collect and kill any dogs since it would interfere with the programme, in 1996 a statement was published in the local paper, The Rajasthan Patrika, which said that the Jaipur Municipality intended to re-commence poisoning.

The Jaipur Society for the Prevention of Cruelty to Animals took out an injunction to stop the killing. The case came before the High Court of Rajasthan on 29th. September 1997. The case judges stated that animal welfare was an important issue. At the second hearing the Jaipur Municipality made a statement that: 'On the basis of the report made by the society, Help in Suffering, the corporation has taken a policy decision not to kill the street dogs. The JMC will continue to deliver all street dogs collected as a result of complaints to HIS.' This officially endorsed the status of the programme within Jaipur.

However, much public and bureaucratic resistance has remained, although some significant steps forward have been taken. In Delhi, the Municipal Corporation has created a new ABC Society as an NGO body. This new NGO has representatives of the Delhi Health Department and other local bodies. MCD has also asked councillors and the chambers of commerce to contribute. In Jaipur, the Municipal Corporation built its own ABC kennels and operations' theatre. After initial enthusiasm the appointed staff became disinterested in the programme and it lapsed into a corrupt paper exercise only. The Jaipur Municipal Corporation eventually faced the reality that it was incapable of efficiently running such a programme and approached HIS to do so, on its behalf. This collaboration has not been without difficulties, especially the corrupt, inefficient and obstructive attitude of some officials, particularly non-veterinary staff, of the corporation, but is now running efficiently.

HIS is fortunate in having a far-sighted corporation, and in particular in the JMC veterinary officer, but unfortunately such a co-ordinated approach is not normally pursued. More seriously 'corruption, caste politics, anti-dog prejudice and lack of funding threaten to reverse seven years of remarkable gains in India towards achieving world leadership in humane street dog control.' (*Animal People*; April 2003).

Corrupt practices are not found only in the government. The tendency of some NGOs to claim they are sterilising more dogs than, in fact, they are, and the falsifying of figures by some unscrupulous NGOs for financial gain has damaged the reputation of all ABC programmes throughout India. The RSPCA in a circular dated 9/4/02 indicated a change in policy towards making grants to ABC programmes as a result of the bad publicity generated by some NGOs falsifying records. The RSPCA went on to state that in view of this it felt ABC programmes are not *as currently implemented* the solution to stray dog population control problems.

## **Status of Street Dog Population**

Previous studies have indicated that no other carnivore occurs so widely and with such a high average population density, and few other carnivore species reach such peak densities similar to those observed for dogs (Wandeler et al, 1993).

The abundance of dogs is dependent on the habitat, especially the availability of resources such as food, water and shelter. Access to these resources depends on settlement patterns, rubbish and waste disposal, rules for keeping animals and other cultural practices. To understand the population biology of the species, it is important to keep in mind the differences in ownership status, degrees of restriction on their movement, social interaction, reproduction and levels of dependence on human care. (Wandeler et al, 1993).

It is clear to us that the population of street dogs is directly related by the amount of food and edible waste matter in an area. Areas of the city which are kept clean, usually because they house affluent, influential people, have a very low dog population; areas of the city with dense, poor quality housing and large amounts of waste have a much higher population. One part of the ultimate answer to street dog population control is to control the availability of edible wastes, water and in places shelter. Legal constraints on dog ownership and control are also part of the ultimate solution imposing licensing and regulation of pet dogs on owners; as are enforcement of both these by municipal authorities and the encouraging of responsible pet ownership so uncontrolled breeding and roaming do not occur.

In many parts of the world, a large proportion of dogs receives little or no supervision. Their movements are not restricted, or restricted only for part of the day. Along with the food received from 'owners', dogs may have access to waste, garbage and other food sources. Reproduction is not under control, but litters are born and raised under the protection of a household (Wandeler et al, 1993).

Dogs that do not have individual owners or a referral household may still be accepted by the neighbourhood as belonging to the community. These animals are 'community owned'. Members of the neighbourhood may assume occasional responsibility for these dogs for example when it comes to protecting them from dog catchers or bringing them to a rabies vaccination clinic.

## **Rabies**

The high density of the human population in Indian cities and accompanying dogs provide ample opportunity for zoonotic diseases to be transmitted. Indeed, dogs are associated with more than fifty zoonotic disease agents of which Rabies is the most prominent (Wandeler et al, 1993).

WHO estimate that 87% of cases of rabies in animals occur in dogs. In Asia the dog is the main vector of transmission of rabies to man. The number of human deaths worldwide caused by rabies is estimated to be between 35,000 and 50,000 annually (WHO, 1996), of which over 20,000 are estimated to occur in India (APCRI 2004).

It is thus clear that the control of street dogs is important for the control of Rabies. Further it is clear that the control of Rabies should be a multi-disciplinary activity involving veterinary departments, health departments and those agencies concerned with civic infrastructure particularly urban cleanliness, and NGOs concerned with animal welfare. No one agency will achieve the results that could be achieved by honest endeavour of all these agencies working together to ensure a rabies free environment for citizens and humane control of dogs.

### **How the Jaipur ABC Programme operates.**

A detailed description of methods used is presented later.

#### Procedural Overview

- a) Selection of a predetermined 'area' from the map of Jaipur, moving in sequential order through Jaipur ABC area.
- b) Capture as many bitches and pups of both sexes as possible from this area and transporting them back to the shelter.
- c) Key-hole flank spaying of all bitches, and castration of all male pups from this area, save those that are not fit to survive on the street either due to extreme aggression to humans, illness or injury.
- d) Vaccination of all dogs against rabies.
- e) Identification by individual tattoo and ear mark.
- f) Release of the dog in the same area as caught as soon as the dog is fully recovered and fit for street life.
- g) Reworking of area repeatedly. When staff return several days in succession without optimum catches, this is the indication that a new area should be selected and worked.

### **Capture and Sterilisation**

The ABC (Animal Birth Control) unit has 47 kennels available for its programme. This number, given the average recovery times achieved by the HIS ABC programme, allows approximately 12 dogs to be caught each day, 7 days per week.

The animals are all collected from the predetermined sector during the early morning when the animals are more visible and there is less human pressure. In some areas of the city evening catching is more effective. A door-less jeep is utilised with an enclosed cage and a one-way flap to capture dogs easily. The capture method used is the only method prescribed by Indian law, that of sack and loop. The method reduces operator risk in an endemic rabies zone and is the most humane. The actual number of females captured is determined by the number of available kennels at the ABC facility. The catchers are informed of the requirements of the facility and are given a bounty to stimulate competition and keep the catching rates high. A bounty is also

paid to encourage staff to catch sick and injured dogs over and above the day's specified quota.

Once the quota had been collected from the sector the animals are returned to the clinic. The design of the ABC facility allows the jeep to be reversed up to a set of unloading gates giving access to an enclosed area. The rear door of the vehicle is opened and the animals are herded into the enclosure. The dogs are then moved into empty individual kennels.

Veterinary staff then fill out the ABC Admission form (see Appendices). Each dog is given an individual number from a central register. The kennel number, the area and sector where the individual dog was picked up, and any distinguishing features are noted in the register. The veterinary surgeon then fills out a kennel card duplicating information about the kennel number, ID number, capture date, place of capture and general description. This card will now stay with the animal for the duration of its stay at the ABC facility.

The dogs are checked then allowed to settle for 12-24 hours. Veterinary staff prepare an ABC Operating Schedule inserting the ID and kennel numbers and description of the animals to be spayed that morning. As operations proceed the ABC compounders fill out the operational details such as vet, date of operation, comments from the veterinary surgeon. These details are recorded on the ABC Operation Schedule, the individual kennel cards and the main register.

The animals are anaesthetised. Bitches are spayed through a flank incision; dogs castrated via a single prescrotal incision. Veterinary surgeons are assisted in surgery by trained, skilled compounders; this shortens considerably the length of each surgical operation.

While under general anaesthesia the left ear is notched using a thermo-cautery device and the right ear is tattooed with the unique identification number of a letter and three digit number.

Formerly a nylon-webbing collar was loosely riveted around adult bitches' necks. The collar colour was changed quarterly aiding ease of identification. However these collars were not generally long lasting, and in a number of cases were responsible for injuries to the dogs once released. The practice of putting collars on dogs has thus been stopped. Collars were a very good way for the public to identify those dogs that had been through our programme.

Once the operation is finished, the animal is returned with kennel card to the appropriate kennel. The veterinary surgeons do a post-operative check on the operated animals and the other animals in the kennels daily. Once a day the veterinary surgeon fills out a kennel checklist. The checklist (see Appendices) shows the veterinary status of each animal and when it is ready for release. From the kennel checklist an ABC release form is prepared. The kennel cards of the dogs that are to be released are clearly marked. The indicated animals are released that afternoon or the next morning. The dogs are released at the same location from where they were taken in the hope that local hierarchies will be maintained by the returning animals.

The small, geographical sectors can be effectively trawled for dogs, until catching dogs in the area becomes very difficult, before proceeding to adjacent areas and so on.

In the early years of the ABC programme the municipality also delivered 'complaint' animals to the shelter. The majority of male dogs in the programme were from this

source. More recently the municipality has constructed its own ABC facility to the north of Jaipur which is now run by HIS in collaboration with the Jaipur Municipal Corporation (JMC). Help in Suffering has also undertaken to respond to dog complaints notified to the JMC. Such complaint dogs are collected and may join the ABC programme at either HIS or the JMC centre; some are humanely destroyed for a number of reasons. Adult males caught as part of complaints received from the JMC are vaccinated and ear notched before being released.

During the course of the programme a number of males and female dogs are brought to the shelter that are terminally ill, badly injured or too aggressive to be enrolled in the programme so in these cases the animals are humanely destroyed. In the early stages of the programme approximately 10% of all the dogs caught for the ABC fell into this category. Figures for the last 5 years indicate that this figure has dropped to 6.4%. This decline presumably reflects the improving health of the Jaipur street dog population.

## **RESULTS**

### **MONITORING THE PROGRAMME**

We consider it essential to monitor the effects of the programme. This is done on two different levels, that of individual dogs and that of the population. Monitoring of the programme as it affects individual dogs is essential to ensure that the Programme's direct interference with the individual dog's well being is entirely beneficial. Monitoring the population is performed to fulfill one of the reasons for the establishment of the ABC programme at HIS, since a better understanding of the population biology of street dogs should allow better methods of control.

#### **Individual Monitoring.**

##### **A. Monthly Recovery Times**

Records are kept of all pertinent facts relating to an animal's stay in the programme. These are compiled from the daily operation list details, releasing list data, check lists and kennel cards. Monthly average recovery times in days (operation to release) are calculated. These are displayed graphically by sex. Thus patterns or problems can be seen as they arise.

##### **B. Recovery Times by Surgeon**

Periodically a review by surgeon is undertaken. This was done regularly for some time, but is now done if circumstantial evidence suggests there may be a problem. In order to have a large enough sample size for each surgeon this review is done over a three-month period, and only includes veterinary surgeons that have completed 100 operations or more. The average recovery time of males and females is calculated separately for each surgeon. As a measure of consistency the percentage of each surgeon's patients with recovery times over 5 days and over 10 days is noted.

Generally this data has shown that all the H.I.S. veterinary surgeons have similar recovery times. However there have been a number of occasions when this clinical audit by surgeon has shown that one surgeon's patients have a prolonged recovery time. With such numerical analysis it is then possible to address such difficult and sensitive problems with more certainty thus improving the welfare of dogs in the programme, increasing the throughput of the programme, and, it is hoped, improving the skills of the surgeon.

#### C. Influences of Compounders

Records are kept of the involvement of ABC compounders in surgery, either as scrubbed operation assistants, or in the role of anaesthetist etc. From this information it has been possible to determine the cause of some temporary problems occurring in the programme, such as ear notch abscesses and anaesthetic deaths. Once problems have been identified and the cause discovered steps can be taken to rectify the problem.

#### D. Post Mortem Examinations

All dogs that die unexpectedly after surgery are subject to a post mortem examination. This helps to ascertain the cause of death, and thus whether the death may be directly attributed to the surgery (through surgical error), the anaesthetic; or to some underlying or pre-existing disease. This information allows for better decisions on the fate of dogs entering the programme, and for reviews of surgical and other techniques.

### **Monitoring of the Population**

This is done through regular population surveys and other methods to establish information about the population and the effects of our programme upon it.

#### a. Breeding Information

The ABC programme at HIS sterilises all female dogs presented to it, including those dogs that are pregnant or in oestrus (heat) at the time of capture. By recording the incidence of pregnancy or oestrus some information on the breeding behaviour of street dogs has been obtained. Similarly records are maintained of the numbers of foetuses which are aborted by the surgery and thus the average litter size.

#### b. Migration Data

For a number of reasons marked (ear notched and tattooed) animals from the programme have been re-captured, when this happens the opportunity is taken to note the identification number and correlate the data with the release site and release date of the dog. This has given some information on possible migration and also longevity of street dogs.

### c. Population Monitoring

Jaipur has been divided into 9 major zones. These areas are further sub-divided along major roads and boundaries into smaller more manageable blocks. Each of the large zones was given a colour for identification purposes; each of the smaller blocks within a coloured area was identified by the name of the predominant colony within that block. In retrospect this system of identifying areas has caused some confusion with local staff, as the staff do not always equate the colony name with the whole area ascribed with its name. It may have been better to have coloured areas subdivided into, say, numbered sub-areas identified more accurately with the actual name of each colony.

Originally each block was subject to direct count of the dog population over a limited period of time. A number of men trawl the sector either in a car or on foot depending on the nature of the area. The counting is usually done very early morning when there is suitable light but before the roads and alleys get too busy with traffic. Sampling at various times in the day has indicated that the most accurate data can be derived from early morning counts. Counting has been refined over the period of the programme. Currently the same team of staff is used to count an area, along the same streets. Counts are done at the same time of year, and at a time when climate and other factors may have a minimal effect on the results.

Recently however, following advice from population biologists about the amount of 'noise' in count figures it has been decided to count only in selected areas of the city. Areas of the city which are still expanding and developing can be expected to have a rising dog population as the area's human population increases, regardless of the success of our programme. To invest resources in counting these rapidly developing areas was deemed unproductive.

During the count a number of items are noted: the date, staff, area and sector. Dogs counted are categorised: dogs, bitches, spayed bitches, pups and unknowns. Pups are defined as animals too small to enter the ABC programme. Animals are put into the unknown category when it is not possible to determine the sex, e.g. due to a distant or quick sighting of the animal only. Definitions are important to ensure that everyone involved in counting is consistent.

Counts have been done twice a year in spring and autumn when the Jaipur climate is relatively benign. However recent advice and analysis of our data has led to the counts being done only once a year to reflect the seasonality of street dog breeding.

It should be noted that the method of counting street dogs employed at H.I.S. is not the best method that could be used. Population biologists have advised other more accurate and efficient methods are available involving much smaller sampling areas. We would advise any new programme to adopt a method as advised by a population biologist (See Appendices).

It should also be noted that while an estimate of the total population is of some scientific use, it is the trends within the population which are of greater interest.

### d. Rabies Monitoring

Rabies incidence data is notoriously subject to many inaccuracies. In India rabies is not notifiable and thus the figures are very inconsistent.

Since HIS also runs a rescue service it would have been possible to collect data on the number of rabid animals the shelter was called upon to attend from the beginning of the ABC programme. This was not done however.

Animal Rabies case figures may be obtainable from the local Government veterinary hospitals, but again the accuracy of this data may be open to question.

For the HIS ABC programme the records of the Infectious Diseases Unit in the main city Government hospital have been obtained by a HIS veterinary surgeon examining the registers of this unit. The human rabies cases recorded were then analysed according to area of origin of the patient and this information sorted into those cases from within the ABC area, those from areas of the city of Jaipur that are not covered by the ABC programme, and the total number of cases seen in the hospital. Attempts have been made to validate the records by visiting some of the families involved.

e. Animal welfare monitoring.

A number of methods have been tried to monitor the effects on the welfare of the dog population. Through the careful recording of the diseases seen amongst the captured street dog population a comparison of the incidence rates of two commonly occurring diseases was performed from two distinct areas of the city covered by the programme, one where the programme has been working for some years and the other from a new area into which the ABC programme had been expanded.

An attempt was also made to use condition scoring techniques to record any differences in the body condition of ABC dogs (those already sterilised and vaccinated) and non-ABC dogs.

## Results of ABC Programme at Help in Suffering

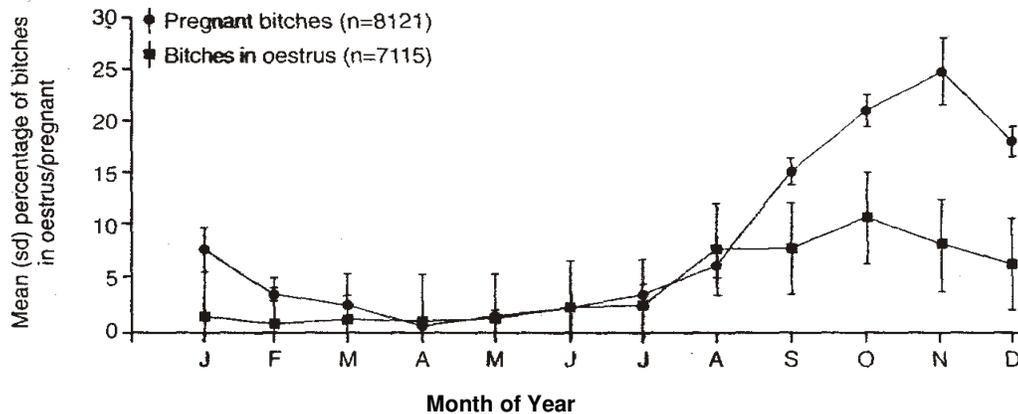
The results of the monitoring of individual dogs done as described above for the ABC programme on a daily basis are not relevant to this discussion. Suffice it to say that such monitoring allows for identification of problems or improvements in the clinical performance of the programme and for these then to be addressed as necessary.

For the whole ABC area of Jaipur a total of over 29,000 sterilisations and vaccinations have been done, usually at the rate of about 3,100 per year.

The results of the monitoring of the whole population have yielded important information on the effectiveness of the programme in several areas.

### **Street dog reproduction information**

The data collected during sterilisation surgeries in the ABC programme show a marked seasonality in breeding amongst street dogs. The main breeding season is within a 4-month period peaking in November. The average litter size is 5.62 pups per litter. This information has implications for the management of the ABC programme, and animal welfare in that most young pups and dogs are received in the ABC programme for sterilisation and vaccination during the coldest months of the Jaipur year (See Chawla, S.K. & Reece, J.F., Veterinary Record (2002) **150**, 450-451).



**Graph 3. Seasonal Variation in Breeding in Street Dogs**

Further analysis of these figures show that only 52% of bitches have a litter each year. This is a very low reproduction rate. The reason for this low figure is at present unclear. There is some suggestion it may be related to nutritional factors, another suggestions that it is related to infection amongst the bitches, possibly Brucellosis.

## Migration Data

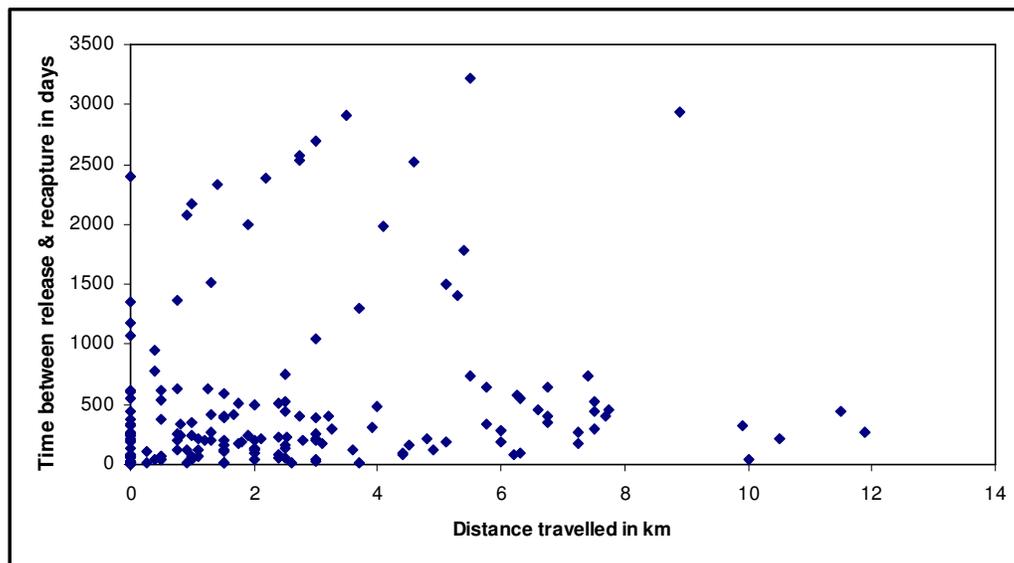
In total 192 dogs were included in the sample of ABC animals recaptured for various reasons. The average distance travelled by the dogs was 2.4 kms and the average time between sampling was 489days.

The largest distance recorded as being travelled by an individual was 11.5 kms; the shortest distance is zero km.

The longest time between release and re-sampling was 3218 days. The shortest time period was 1 day.

From this data it has been possible to estimate the longevity of street dogs in Jaipur. For dogs which survive to one year the average age at death is 3.7 years. The chance of such a dog living to 6 years of age is 14%; the chance of a dog, having attained one year reaching 10 years of age is 3%. However, these figures have excluded the considerable mortality which occurs amongst pups and young dogs which has been estimated by others at about 80%.

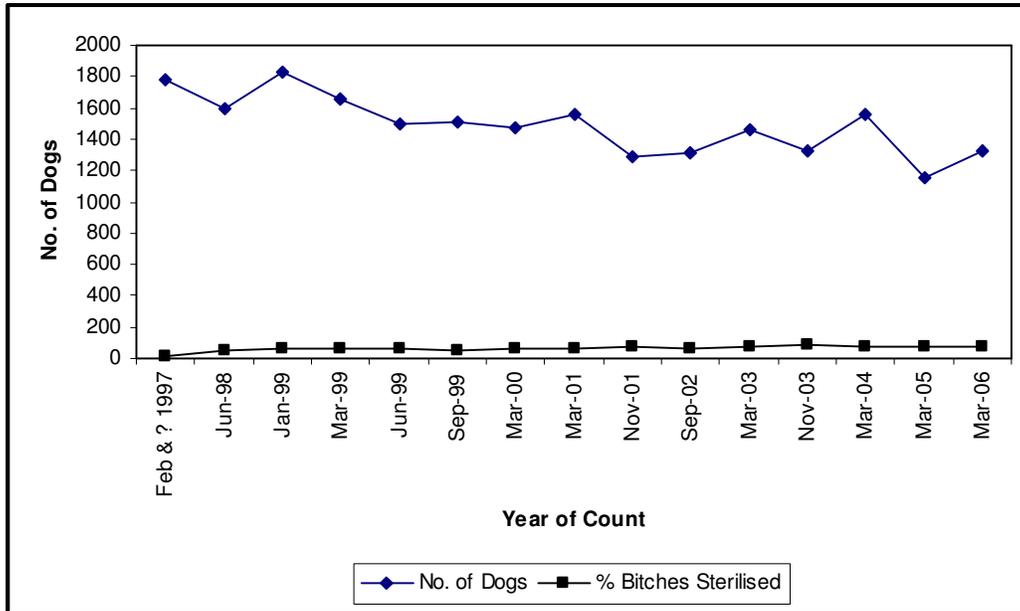
Although conclusions about territory size are less easy to draw it is clear from the data that street dogs do not move areas through a gradual process of drift, and that some, at least, are territorial. Further work remains to be done to establish the territories or home ranges of Jaipur's street dogs.



**Graph 4. Scatter plot of Migration Distances and Times**

## Population Surveys

Although not without inaccuracies there are some conclusions that can be drawn from the population survey data. After 5 years of conducting the programme in the study area the population of street dogs had declined by 28% of its peak. Thereafter the street dog population in Jaipur has remained relatively stable. The proportion of female dogs sterilised and vaccinated against Rabies has, in this time, risen to about 70% of the total female population.



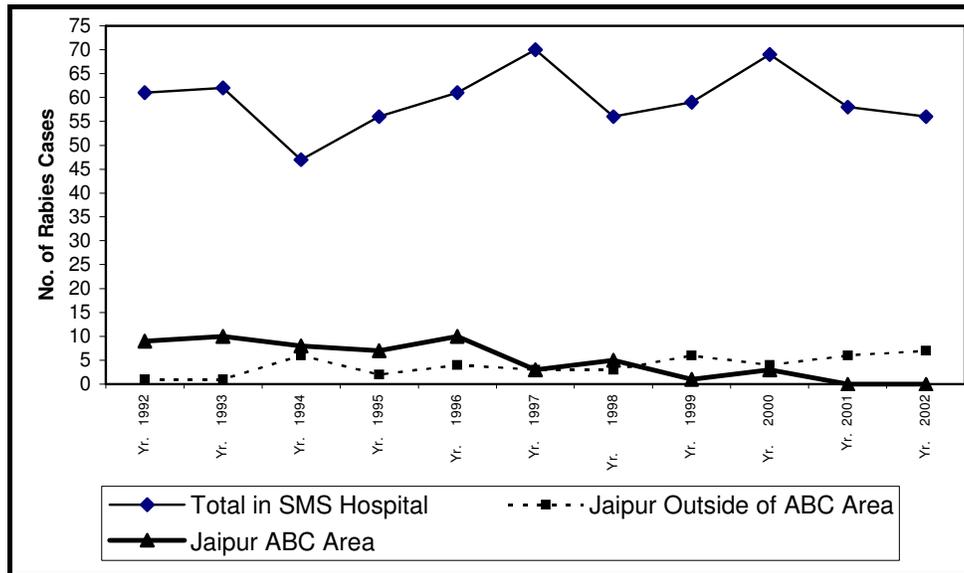
**Graph 5. The Decline in Street Dog Population since the start of the ABC Programme**

From initial surveys undertaken at the start of the Programme's activities in a certain area, and from the number of dogs subsequently caught from that area suggest that a factor of 2.5 times the surveyed number may represent the number of animals which will be caught in the first few sweeps of an area for the ABC programme.

Population surveys have also revealed that dog population is related to street cleanliness, particularly the availability of food. Areas of high food availability have high street dog populations. This is what would be expected in any biological population. Plans are afoot to assess and correlate the population and a semi-objective method of assessing the street hygiene in order that this subjective observation may be made rather more objective.

## Human Rabies Survey Data.

The human Rabies data collected from the main Government hospital in Jaipur and analysed as described above show that there has been a decline, in the ABC area of Jaipur, from about 10 recorded cases per year at the time of the start of the ABC programme (in 1994) to zero for the last two years. In areas of the city not covered by the ABC programme the human rabies numbers have remained the same or have increased.



Graph 6. The Decline in Human Rabies Cases in Jaipur since the start of the ABC Programme

## Animal Welfare Assessments.

Subjective assessment of Jaipur's street dog population give the impression that the dogs here are in better condition than in other cities, and that ABC dogs are in better condition than the rest of the dog population.

A comparison of the incidence rates of two commonly occurring disease of street dogs (mange and transmissible venereal tumours) failed to reveal a difference in the incidence of these diseases between the populations of dogs in areas where the ABC programme had operated for some years and a new area of the city being worked for the first time.

Attempts to use body condition score to show any potential effects of the ABC programme on the welfare of the dogs also did not reveal any differences between the condition score of ABC dogs and those of non-ABC dogs. The sample size in this investigation was small and the condition scoring of dogs proved to be rather more difficult than was initially envisaged.

The fact that the proportion of dogs entering the programme which are humanely destroyed on welfare grounds has declined as the programme has developed from over 10% in the early years to 6.4% in recent years (although the criteria for this decision have remained unaltered) may suggest that the overall health of the population and thus its welfare has improved.



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## **VETERINARY GUIDELINES FOR ABC PROGRAMMES**

Prepared by veterinary surgeons at Help in Suffering, Jaipur, Rajasthan, India.

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## **IMPORTANT NOTE.**

**In Rabies endemic areas it is imperative that ALL staff are fully vaccinated against Rabies before they begin work with street dogs (See Appendices).**

### Catching

When catching, it is important to explain to the local people why the dogs are being caught, what the programme will do to the dogs and the benefits that this will bring to the area. As the H.I.S. programme has gone on the need for explanation has reduced as public awareness has increased.

Team of three men - one man drives the vehicle; the other two handle the dogs. The vehicle should be parked not less than 30 metres from the expected point of capture. It is usually only possible to catch 2 to 4 dogs from the one street and then move on, though if more present themselves they too will be taken.

At Help in Suffering catching of dogs is done immediately after the release of dogs that have already been through the programme. Catching and releasing are made much easier if they are done in a logical manner according to a systematic plan so that most releasing is done in areas near to the catching area. In this way efficient journeys are undertaken, and there is less opportunity for inadvertent or deliberate release of dogs in the wrong place. This clearly has advantages for the welfare of the dogs concerned.

At HIS we have maintained that a range of catching methods is required in different situations. We also maintain that the methods used must be safe for staff, be welfare friendly to the dogs concerned; and importantly must be resistant to abuse. It has to be accepted in India that many of the staff retained to catch dogs, particularly those from Municipalities, have no intrinsic interest in animal welfare per se. The methods used to catch dogs must thus be, as far as possible, incapable of being abused in unsympathetic hands.

### **Methods used**

1. By hand - friendly dogs can be caught this way. The dog is held firmly by the scruff (the loose skin on the dorsal neck) as close to the head as possible with one hand and lifted with the other hand under the body. Catching dogs by the scruff nearer the shoulders may allow the dog to twist around while held and bite the catcher. Most friendly dogs tolerate this technique well provided they feel secure. Nervous catchers restrain less well which tends to make the dogs feel insecure. The dog then struggles more. Clearly lifting a 20 kg dog of unknown temperament by hand in this manner requires some courage, physical strength and knowledge.

2. Using 'sack and loop' method.

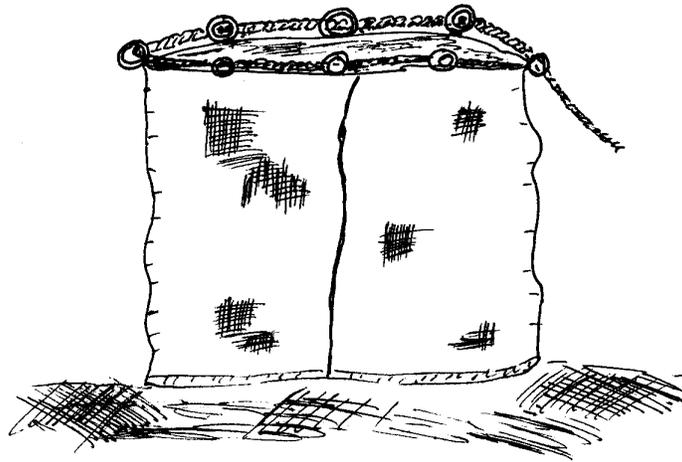
Rule 3 of the Prevention of Cruelty (Capture of Animals) Rules, 1979 (made in exercise of the powers conferred by S.38 (2) (i) of the Prevention of Cruelty to Animals Act, 1960) provides that "no animal (except for birds; and except for animals which cannot for specified reasons be captured by such method) shall be captured for

the purpose of sale, export or for any other purpose except by sack and loop method.”  
The explanation to the rules reads -

“An animal is said to be captured by the sack and loop method if in its capture the following contrivance is used, namely, strong canvas in the form of sack, not less than 92 cms in length and 138 cms in diameter, which has a smooth rope, not less than 5.5 metres in length passing through ten or more rings of not less than 4 cms in diameter each attached at the open end, thus forming a loop, the sack having small holes at convenient places to enable the animal to breathe during captivity, and the animal is captured by the sack being thrown on it and secured by having the rope pulled.”

It is the professional opinion of all the veterinary surgeons that have been involved with the ABC programme at H.I.S. that the sack catching method is by far the most humane method of catching dogs which can not safely be caught by hand. No injuries to dogs have been recorded following capture in a sack throughout the time this method has been used. Equally very few injuries to staff have resulted from the use of this method. Furthermore the catching sack method is hard to abuse in the hands of inexperienced staff whose main consideration may not be animal welfare. The experience of the ABC Programme’s veterinary surgeons with other dog catching methods has been that injuries to dog and catchers result, and that these other methods are open to abuse by inexperienced or welfare unfriendly staff. A further advantage of the catching sack is that it is an inexpensive, appropriate technology readily available and cheaply made in developing countries. Western made catching equipment may be very expensive, and local made versions of it are less refined than the original, and are more expensive to make than a catching sack as described above.

The use of the catching sack requires considerable skill on the part of the catching team, probably more than would be required for the use of catching poles, nooses etc. This means that new staff must be properly trained. At HIS this is done first in the shelter on tame dogs, then within the ABC compound on street dogs recently captured. Novices are then sent as an extra member of the catching team with experienced catchers. Only when everyone is happy that they have learnt the required skill are they sent as a normal member of the catching team. It is also worthy of note that when HIS began catching by this method the existing staff took some convincing that this method was superior to those previously used. However, our staff now will use no other method routinely. This may mean that in other organizations managerial pressure may need to be brought to bear to ensure a change in method is permanently accomplished.

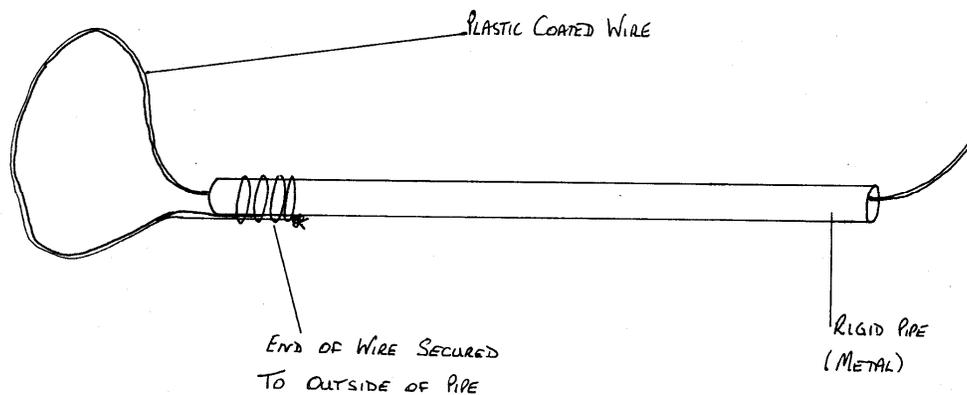


Sketch of Catching Sack

Two men work as a team. One man distracts the dog usually with a small amount of food (bread is used). The second man catches by throwing the sack over the dog and quickly pulling the rope tight so it is trapped inside. The sack is then carried to the vehicle and placed inside. The top of the sack is opened to expose part of the dog - the dog then moves out of the sack.

It is important that sacks are regularly cleaned or the dogs become very suspicious of the smell. Efficient catching requires that the catching sacks are kept in good order and replaced or repaired regularly. HIS staff prefer catching sacks to be made of nearly new sugar sacks. These have a tight weave and last longer. Moving film footage of the catching sack method are available on the electronic CD version of this Manual

3. For animals hidden beneath vehicles, gutters etc. the sack can be used in combination with a catching pole.



Sketch of 'Home-made' Catching Pole

The catching pole is about 3 feet (1 metre) long, and hollow. Cable, ideally shielded in plastic, of the type used in vehicle clutches, or bicycle brakes, is secured at one end, and then threaded through the pole, leaving an adjustable noose protruding from the end. The noose of the catching pole is placed round the dog's neck and the rope pulled until it fits snugly. The animal is pulled gently forwards until it is just clear of the obstacle, then immediately covered with the sack, and the pole removed. However because the catching pole method is so open to abuse, even from experienced staff, HIS veterinary staff discourage its use.

4. The majority of dogs are caught without the aid of any medication, although in open spaces, where catching dogs is difficult, we have, in the past, used oral sedatives to facilitate catching. However not only open spaces create problems. There are wary dogs throughout the city that are not being caught. Every effort should be made to catch these dogs not only to sterilise the dog population adequately but also to prevent bitches of less desirable temperament reproducing and passing on their traits. Using sedatives to assist catching has not proved satisfactory as they take a considerable time to work; have variable effects on different animals; are effected by the levels of external stimulation; and require considerable time and manpower.

Amongst the drugs used are

i) Chlorpromazine tablets - 5 mg per kg of bodyweight

- slow to take effect: i.e.: one to two hours (we have found it works better if a meal is given)

- level of sedation varies from light to heavy

- as animal becomes drowsy it travels for some distance and looks for a sheltered place to sleep.

ii) Diazepam tablets - 1 mg / kg

- 20-30 minutes time to take effect

- sedation varies from light to moderate

These drugs have been used mainly to catch a batch of dogs where there has been a complaint and not as a daily routine.

We have recently acquired a dog trap and a blowpipe to assist in catching these difficult and wary dogs. These we are trying currently, though there are reservations about the safety and practicality of using such equipment in the crowded urban environment in which we work.

## **Puppies**

Puppies less than about four months of age (about 7kg bodyweight) are not caught. Younger puppies are less dominant and struggling to establish themselves on the street. They have less resistance to disease compared to adults. The extra stress of being caught, undergoing surgery, and replaced in a slightly different location, although always the same sector, may reduce their chances of survival.

Conversely puppies are easier to catch, handle and operate on than adults and their wounds heal quicker. Furthermore other studies indicate that it is young dogs which

fight most and are most at risk from rabies. Clearly the treatment of puppies represents a compromise between animal welfare and the requirements of rabies control.

Surgically there appear no reasons not to operate on puppies as young as 8 weeks of age. However the anaesthetic regime we are obliged to use, and the ambient temperature at peak puppy season do preclude the safe inclusion of very young puppies in the programme. Hypothermia is a real risk to small puppies. The effective vaccination of young animals when they still may possess passive immunity acquired from their mothers can be problematic, and is another reason to wait until the pups are at least 3 months old.

## **Vehicle**

Up to twelve dogs are placed in the vehicle. They rarely fight, probably because they are off in their own territory and also a little shocked by the experience.

A 'jeep' type vehicle is used, the rear section of which has been converted into a single cage with solid roof and floor. The sides of the cage are solid to a height of 36 cms for the flanks and rear, and to a height of 63 cms in the front. The cage walls and door are solid. Above the solid sections an iron framed strong 2.5 cms square wire mesh is used. This provides an airy, open and seemingly non-confining cage, which the dogs can see out of and which does not seem to worry them. The dimensions of the cage are 144 cms in width, 138 cms in length and 139 cms in height. At the rear into the normal side-swung door or gate is an inward-swinging trap door 79 cms in width by 40 cms in height hinged along the top through which dogs can be lifted into the cage, one at a time, without allowing others to escape. The lower solid part of the door that is at floor level is used when releasing dogs. Our vehicle is designed to provide a good through flow of air since in Jaipur it is the heat, not cold, which is more likely to cause transport problems. It is important that the vehicle is constructed in as robust manner as possible. We have recently changed from mainly wire mesh to iron bars to form the bulk of the dog area of the vehicle because mesh can be broken by dogs particularly if it is of inferior quality.

## **Kennelling**

Detailed notes on kennel design are in the Appendices.

HIS use individual, walk-in kennels; these are easy to clean, secure, and safe for dog handling. Overall internal measurements are 1.08 metres width, 1.34m depth, 2.2 m height. The floor is concrete and slopes to the front to an external drain. Some kennels have an underground drain fed by a grill-covered pipe in the middle of the floor. A platform some 15cms high and 50cms deep runs the full width of the kennel at the rear and gives the dogs a raised resting place.

The walls are concrete to 2m, then steel mesh of 2.5cms square extends some 20cms to the roof. The sloping roof is uninsulated corrugated Fibro, trees overhang the kennels to provide shade.

Barred windows at the rear of the kennels provide additional light and ventilation. The bars on the windows should be so positioned as to exclude an internal window sill,

onto which dogs will otherwise try to climb. The doors swing in and out and are 185cms high and 70cms wide. They are made from 12mm vertical steel bars with a spacing between bars of 5cms, sufficient to contain puppies. The spacing of bars is important if pups are not to escape. Bars on both doors and windows should only be vertical since dogs will climb up horizontal bars. The fastener is a single bolt-style latch.

The kennels are arranged in separate lines each within an enclosed yard within the ABC complex. Separation of the kennel yards with inter-connecting gates allows more efficient and welfare friendly dog movement. The yards also allow any long term residents in the kennels to be exercised without fear of their escaping. The whole ABC kennel complex is surrounded by fencing (of vertical iron railings) to a height of between 7'6" and 8'. Some areas have inwardly facing inclined fencing at the top to deter dogs climbing out.

Kennels are hosed out each morning and additionally faeces is removed each afternoon. They are regularly washed out with dilute phenyl and rinsed. Kennels are repainted with lime wash every three months or so. In winter dogs are provided with hessian sacks for warmth. In the hot weather dogs prefer to lie directly on the cool concrete and so the sacks are removed. This helps reduce potential sources of infection, as the sacks are difficult to thoroughly clean.

Generally we keep only one dog in a kennel to avoid fighting and bullying but exceptions are sometimes made (for example litter mates; or mothers with pups).

The dogs are fed twice daily with fresh leftover food obtained free from the restaurants of the Jaipur Sheraton Hotel. Water is always available in the kennels.

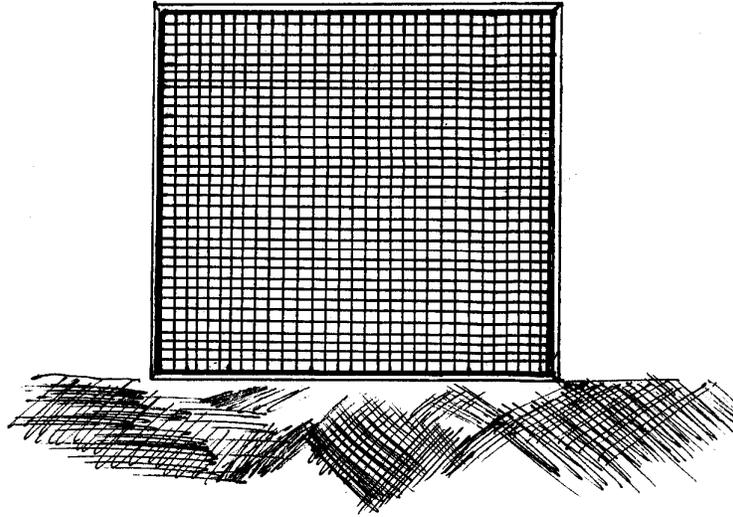
## **HANDLING DOGS AT SHELTER**

### **Unloading**

The back gate of the vehicle is opened directly into the kennel run and the dog allowed to walk out.

They are either:

- lifted and carried into kennels (see hand-catching)
- walked into kennels (using team work with mesh gates)



**Sketch of Mesh Gate used to move, inspect or treat dogs.**

The wire mesh gates measure about 3ft 6inches square and are made locally of 1 inch square steel mesh. Repairs are necessary occasionally to ensure no sharp edges. Aluminum mesh gates were tried but although these were found to be much lighter to handle, they did not last as long, and were very expensive to make and repair.

### **Uses**

1. Herding/walking dogs into kennels
2. Injecting fractious or frightened dogs with e.g. pre-medication; antibiotics etc. (Friendlier dogs are restrained via a scruff and muzzle hold to administer injections and check wounds.
3. Checking wounds post-operatively in fractious animals. Topical medication may be applied through the mesh.

### **OPERATION PROTOCOL**

Dogs are operated on the day following their capture. This gives time for them to recover from the stress of catching and handling. They are fasted overnight to ensure an empty stomach and hence a reduced anaesthesia risk. Water is available to dogs at all times right up to surgery. Although, in theory, increasing the risk of vomiting under general anaesthesia, this has not found to be a problem. The practice does ensure that dogs are adequately hydrated at the time of surgery. Given the extreme climate in Jaipur this is felt to be an important consideration. Should it be necessary to anaesthetise a dog which has recently eaten the routine pre-medication is replaced with xylazine (2mg/kg bodyweight i.m or i.v.) since this usually induces vomiting prior to induction of anaesthesia.

Formerly on the evening before surgery the dogs were each given a 200 mg amoxicillin tablet, this ensured surgery was performed under antibiotic cover. With increasing experience and expertise we have discontinued this practice, but see below.

Between 8 to 12 operations (ovariohysterectomies and castrations) are performed each morning.

## **PRE-OPERATIVELY**

A summary of anaesthetic regimes used at HIS is attached at in the Appendices.

1. Bitches are pre-medicated in kennels by intramuscular ('I.M.')

injection into the hind leg, care being taken to avoid the sciatic nerve which runs caudal to the femur. This is done at least 20 minutes before the induction of general anaesthesia. All animals to be operated on receive premedication at the same time. Normally this means the last dog to have surgery will have received its pre-med injection between 1 and one and a half hours earlier. If a longer delay is expected, because of the number of operations, shortage of surgeons or assistants etc then the premedication injection is delayed until nearer the estimated time of surgery. As with most sedatives and premedications the effect achieved is better if the animal and its environment is quiet and calm at the time of injection and while the drug has its effect.

### **Pre-medication**

i) The bitches are sedated, and their anxiety relieved, by pre-medication. Most of the animals are not used to being handled. Restraint to administer intravenous ('I.V.') injections etc. is much easier and safer for the handler following pre-med.

ii) If a pre-med is used the amount of I.V. anaesthesia required is reduced by up to 30%; therefore administering pre-med reduces anaesthesia risk and allows more rapid recovery from general anaesthesia (G.A.).

Although Acepromazine (ACP) (at 0.1mg/kg sub. cut. or i.m) is generally preferred other pre-meds are used because no supplier of ACP has been found in Jaipur:

i). Triflupromazine - 2.2 - 4 mg / kg – i.m. Readily available, however, the sedative effect maybe unpredictable. Often only very light sedation is achieved.

ii) Chlorpromazine, though of late this has been withdrawn from the market in Rajasthan.

iii) Diazepam. (0.5mg/kg bodyweight)

2. Bitches are muzzled, if necessary, in the kennel (the jaws are tied with bandage) and the patient is then carried to the preparation room from the kennel.

3. The veterinary surgeon indicates when he will be ready for the next operation. Anaesthesia is given approximately 4-5 minutes prior to the operation start. Only injectable anaesthesia is used. Although initially we used thiopentone we now use exclusively a xylazine/ ketamine combination following pre-medication with triflupromazine. This is administered through a catheter / scalp vein set. Because of the volume of the catheter it is important to flush the vein set with normal saline to ensure the full intended dose of anaesthesia is received by the dog. The bandage muzzle is removed; the dog's mouth opened so that the tongue drops to one side and will not block the airway.

The xylazine (20mg/ml) / ketamine (50mg/ml) mixture is 1/3 by volume xylazine and 2/3 by volume ketamine mixed in one syringe (e.g. 3ml xylazine and 6ml ketamine in 10ml syringe), and is administered intravenously at a rate of 2ml for 10kg dog:

3ml for 20kg dog:

4ml for 40kg dog.

A period of 90 seconds should be allowed for full effects before considering further doses. Top up if necessary should be in 0.5ml aliquots.

This combination allows good anaesthesia and much quicker and more satisfactory recovery in dogs. Animals anaesthetised with this mixture may blink and keep a swallow reflex; depth of anaesthesia must be monitored on signs other than these.

It is important to note that xylazine alone does not give the required analgesia or anaesthesia for major surgery such as spaying or castrations. Consequently it must NOT be used unless in combination with another agent giving adequate analgesia. One advantage of ketamine over thiopentone is that ketamine has itself analgesic properties.

Should it be necessary to anaesthetise aged or sick animals (for surgery other than routine ABC sterilisation) a mixture of Diazepam (5mg/ml) and ketamine (50mg/ml) in equal volumes may be given at 1ml per 10kg bodyweight.

If it necessary to use thiopentone we strongly recommend using a 2.5% solution rather than a 5% solution. If any thiopentone is accidentally injected peri-vascularly (outside the vein) 5 to 10 mls of the sterile normal saline is immediately injected into this area in order to dilute it. Thiopentone solution is very irritant to the tissues and unless diluted will cause tissue death and skin sloughing.

Once anaesthetised the following procedures are performed in the preparation room prior to surgery.

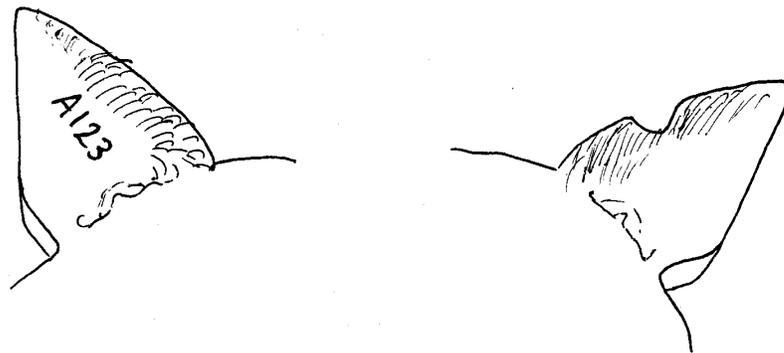
1. The operation site is shaved using a safety razor (from which the lateral bars have been removed) and chlorhexidine solution (Citalon). It is far better to shave a large area, certainly larger than the fenestration in the drapes used, than to shave too small an area.

2. The skin at the operating site is thoroughly cleaned with a dilute Povidine Iodine solution (bactericidal and virucidal). Povidine iodine solution is more

effective if used diluted by water. This cleaning should be done from the centre of the operation field to the periphery so that the incision site is the cleanest area. Long haired animals should have the hair surrounding the shaved area dampened to restrict movement of hair.

3. The left ear is notched using thermo-cautery.

The medial edge of the left ear is grasped with 1cm round-nosed forceps and the cautery unit is used to cut around the forceps, leaving a notch of 1cm diameter in the ear. When notching ears it is important to let the thermo-cautery device make the notch rather than the operator pulling at the forceps to create the notch. Notches should be checked post-operatively, as occasionally a notch may become infected. Infected notches can be very difficult to treat, and seem to result from excessive force on the forceps at the time of notching. Ear notches are easily spotted from a distance and difficult to confuse with tears due to fights etc. If it is not possible to give dogs ear notches due to electrical or equipment failure then operations are halted for that day. Release of a dog without an ear notch may result in an additional, unnecessary anaesthetic and operation being undertaken in the future. Different projects may use different sites, methods and models for ear notching. It is important that all ABC projects in an area recognise an ear notch. Ear notching without electrical power is used by some projects using mosquito clamps or similar as haemostats.



4. An individual identification tattoo is placed on inside of right ear. Tattoos are only necessary if a project intends to follow individual animals through a recapture programme.

5. I.M. injection of long acting amoxicillin or penicillin of approximately 48 hours duration. Dose of 300 mg per dog is given.

6. Meloxicam has become available and is now used in place of diclofenac sodium as an analgesic. Meloxicam is effective for up to 24 hours. All dogs under going surgery should receive analgesia and this is more effective if given prior to the onset of the painful stimulus, i.e. surgery. As with all NSAIDs the dose of Meloxicam should be calculated carefully to avoid

overdosing with its attendant risks of gastro-intestinal ulceration. The meloxicam preparation we use can be administered intra-venously which ensure a quicker onset of action. We currently inject this following the anaesthetic again flushing with saline.

Formerly we used the NSAID, Diclofenac sodium since this was the standard veterinary non-steroidal drug. However following reports of the disastrous effects this drug has upon vultures eating any carcass containing the drug we have stopped using this drug. The Government is to be congratulated for its efforts to ban the veterinary use of this drug.

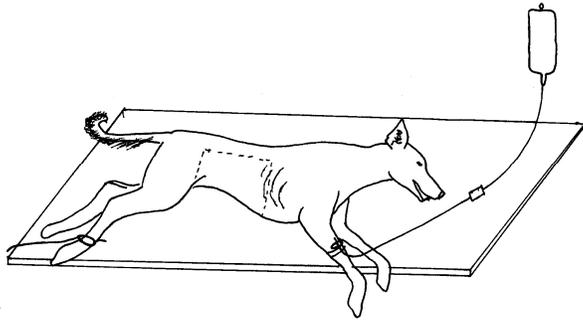
Should a painful non-ABC operation be planned, the use of the opiate pentazocine is recommended as an intra-operative and post-operative painkiller. This is given at the rate of 1ml of 30mg/ml pentazocine solution per 15kg bodyweight. The effects last for approximately 4 hours. The use of pentazocine will reduce further the amount of general anaesthetic agent required. As with all pain controlling drugs the effects of diclofenac, pentazocine or other painkillers are better if administered before the onset of pain.

The principles of good analgesia dictate that pain is prevented most effectively by the use of a combination of drug types; opiates, NSAIDs, local anaesthetics, and centrally acting analgesics such as ketamine. Pain relief is ESSENTIAL for the welfare of patients and must always be considered. While the range of drugs available in South Asia may be limited at least one of each class is available here. Pain must always be considered deleterious to our patients. References on the subject of analgesia can be found in the appendix on anaesthesia.

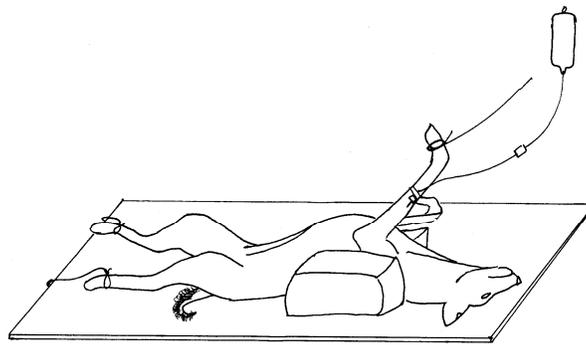
7. Rabies vaccination is given. A tissue culture vaccine is given. Published evidence suggests that immunity to challenge persists longest if such vaccines are administered intra-muscularly. At HIS the quadriceps muscle mass is used in the hind leg. The lumbar muscles are an alternative site. See notes on Rabies vaccination in the Appendices.

The dog is then carried carefully into the operations' theatre. Care must be taken when carrying anaesthetised patients that the prepared operation site is not inadvertently contaminated. The animal is then:

1. Positioned on the operation table. It is important to have patients, particularly bitches, correctly positioned for easy surgery.
2. Surgical spirit is applied to operation site.
3. An infusion set is attached to the i/v catheter and normal saline is slowly administered throughout the operation. In addition to improving the hydration status, this prevents blood clotting within the catheter, and allows easy administration of extra anaesthetic or other drugs as required.



**Position of bitch for Flank Spaying**



**Position of Bitch for Mid-Line Surgery**

## **STERILITY**

The importance of strict adherence to good aseptic practice can not be over emphasised. Condoning breaches in sterility and aseptic practice is unprofessional and may jeopardise the welfare of our patients.

The sterility of the instruments is of great importance to prevent infection. An electrically powered autoclave is used for this purpose. This method is capable of destroying all bacteria, spores and viruses. A minimum of 13 minutes at a pressure of 15 psi (=120°C) is required to achieve sterility. On a practical level we bring the autoclave to 20 psi, hold this for 4 minutes, and then allow it to cool. All instruments and drapes should be allowed to dry for a minimum of 20 minutes following sterilisation cycle.

Prior to placing instruments in the autoclave, they are cleaned with a stiff hand-brush and dilute chlorhexidine, then rinsed with hot water and allowed to dry (ordinary

soaps are avoided as they leave behind an insoluble residue that affects steam penetration). Each surgical kit is wrapped in a drape and closed with a small piece of autoclave tape (a chemical indicator that undergoes colour change at a certain temperature.) It indicates the required temperature has been achieved but gives no indication about exposure time. Periodically (weekly) indicator strips are used which indicate both temperature and time. This allows regular checks on the working of the autoclave to be made. Autoclave indicator tape is available in India. Domestic pressure cookers can be successfully used as an instrument autoclave if a purpose designed machine is not available. In this case care and experimentation may be needed to ensure adequate sterilisation while allowing the production of dry drapes. (Wet sterile drapes serve little purpose as bacteria 'wick' through the cloth from the underlying unsterile surfaces.)

Autoclaves are pressure vessels and as such are dangerous equipment. At HIS we have had one autoclave explode with dramatic, disastrous and expensive effect, though luckily no injuries. Pressure vessels should be checked for integrity on a regular basis if possible. (In the U.K. this is a legal requirement.) We have not been able to locate a suitable testing service, nor have we been able to find a local autoclave manufacturer who understand the need for checking or who will give any guarantee as the integrity of the machines they manufacture. In the absence of such an inspection service we strongly recommend that autoclaves are sited in an isolated position to reduce the risks should an explosion occur. (We use a well vented, small, gated chamber that was formerly a staff lavatory.)

The surgeon and assistant scrub up using disinfectant soap and povidine-iodine solution (Betadine) and tap water, then, when the hands are dry, don a pair of sterile gloves in normal aseptic fashion without touching the outer surface of the gloves. Formerly chlorhexidine solution (Citalon) was used for scrubbing up but was found to cause skin reaction amongst some staff. It should be self evident that it is not possible to scrub up satisfactorily while wearing any kind of jewellery on the hands or arms, including string bracelets. All such should be removed beforehand. Help in Suffering allows no exceptions to this rule under any circumstances. Fingernails should be kept short and clean. Effective scrubbing up, which is different to washing hands, is dependent on the length of time that the cleansing solutions are in contact with the hands. This is particularly so with povidine iodine solutions.

Scrubbing up sinks should be so designed that there is no risk of accidental contamination of the hands during scrubbing. Taps should be operated by elbows and soap/ betadine dispensed from elbow operated containers. Alternatively assistants can be used to turn taps on and off, and dispense the required solutions. Scrubbing brushes should ideally be sterile (autoclaved); although we compromise by permanently keeping our brush fully immersed in a chlorhexidine solution.

Learning to put on surgical gloves in a sterile manner takes time and practice. It is easiest if the hands are completely dry. The outer surface of the gloves must never touch anything that is not sterile including the surgeon's skin.

Ideally a new sterile operating kit and pair of gloves would be used for each operation but this is not possible due to cost and practicality of sterilising the number of kits required. As a compromise HIS use one pack for up to 7 operations. (Careful monitoring of recovery times and infection rates has failed to reveal any deleterious effects of this practice.)

Between operations any blood and tissue debris is wiped from instruments using a Betadine or surgical spirit soaked swab. The surgeon cleans his gloves using Betadine or surgical spirit.

The operations room should be kept as clean and as uncluttered as possible. Particular attention needs to be paid to lights, fans and coolers to ensure that dust deposits neither build up nor are scattered into the operations' theatre air. Coolers and fans, if they have not been used for some time, ideally should be cleaned and operated in the theatre some hours before the commencement of surgery so any dust generated has time to disperse before surgery. If designing a new theatre it is good practice to limit the number of horizontal surfaces to the minimum practicable by eliminating ledges, shelves, protruding door jambs etc. This minimises the areas on which dust may settle. Preventing the entry of flies and other insects is also most important. We use an ultra-violet type light which attracts and kills any flies that may enter

Surgeons and surgical assistants wear surgical pyjamas but these are not sterilised. Ideally sterile long-sleeved gowns would be used together with closed gloving procedures. However at HIS this ideal practice is not followed because of limited autoclave space; difficulties with the various sizes of gowns that would be needed; and the discomfort of wearing long sleeves in the Jaipur heat. However the operating clothing does not leave the ABC building. The use of surgical masks and hats has been considered unnecessary given the risks of environmental contamination from the dogs themselves. Staff handling and preparing dogs for surgery wear plastic/waterproofed cloth aprons.

In the event of power failure we use a generator, though good design may allow sufficient natural light to allow surgery to continue. Surgical lights will often need protecting from fluctuations in current and voltage since bulbs may otherwise blow frequently.

## **SURGICAL PROCEDURES**

Successful surgery requires careful attention to details. The importance of aseptic technique and gentle tissue handling can not be over-emphasized.

### **Equipment Required**

The basic surgical pack, used at H.I.S. for spays and castrations, consists of the following instruments. This pack has also been found to be adequate when dealing with most small animal surgical cases (excluding orthopaedic procedures). Experience has taught us that it is false economy to buy anything other than the best surgical instruments available. Spay hooks seem unavailable in India. The operation can be performed without but it is far easier, and can be done through a much smaller incision with such a hook. Help in Suffering has hooks made locally to our surgical specifications. These are available from us if required. We have a rolling schedule for replacing surgical equipment which probably means that many items, such as scissors and clamps, are replaced between once and twice a year. Clearly the longevity of each instrument will depend on the number of operations performed, the care given to the equipment and its quality. (Many discarded surgical instruments can be used in other less exacting tasks around a veterinary clinic)

- 4 towel clamps
- 1pr rat tooth forceps
- 1 scalpel handle to take no. 10 blades
- 1pr Mayo scissors
- 4 Allis tissue clamps
- 4 5 inch artery forceps with 1inch jaws
- 2 7 inch artery forceps with 1.5 – 2 inch jaws
- 4 small mosquito forceps
- 1 spay hook
- 1pr needle holders
- 1pr scissors (for cutting suture material)
- 1pr smooth thumb forceps

In addition the following are needed:

- 1 Plastic sheet 37"x26" (92 x 65 cm) with window 6.5 inches (17cm) square, this prevents wicking of infection from underlying skin and hair through wet patches on drapes;
- 1 Surgical cloth drape 32" x28" (80 x 70 cm) with window asymmetrically placed of 2.5" x 4" (6 x 10 cm). The window is placed so that its left-hand border is in the midline of the drape. This enables the dog's hind feet to be fully draped by a moderate sized drape. The window's long axis runs cranio-caudally when placed on the positioned bitch. Drapes are of surgical green cotton. A new drape is used for each operation. It is better to have extra, sterile drapes available during an operation list in case of accidental contamination etc. Very occasionally we will remove a heavily soiled drape and re-drape

during an operation should contamination make this necessary. Drapes are made locally by a medical supplier. Initially our fenestrations were rectangular as described above. More recently we have used drapes with elliptical fenestrations of similar dimensions to those given above. These appear to last longer and do not fray at the corners of the fenestration as easily as rectangular ones.

- 2 Cloth trolley drapes of suitable dimensions to cover fully the instrument trolley. One trolley drape is used to wrap the surgical instruments; the other is placed on the instrument trolley to receive the wrapped instruments. Trolley drapes are of surgical green cotton and do not have windows.
- 5-6 Gauze swabs per operation. These are home-made from surgical gauze by cutting several thicknesses of gauze into rectangles of about 9" x 7". These are then folded to produce surgical swabs of approximately 2" square. When folding gauze every effort is made to ensure that all outer, cut edges of gauze are folded to be within the swab. Careful folding results in effective swabs that do not shed pieces of cotton fibre into the surgical site.

The number of swabs used varies considerably between operations and surgeons. It is better to have too many gauze swabs prepared before surgery than for a shortage to develop during surgery. For autoclaving our swabs are contained within an old surgical drape

## FEMALE SURGICAL ANATOMY

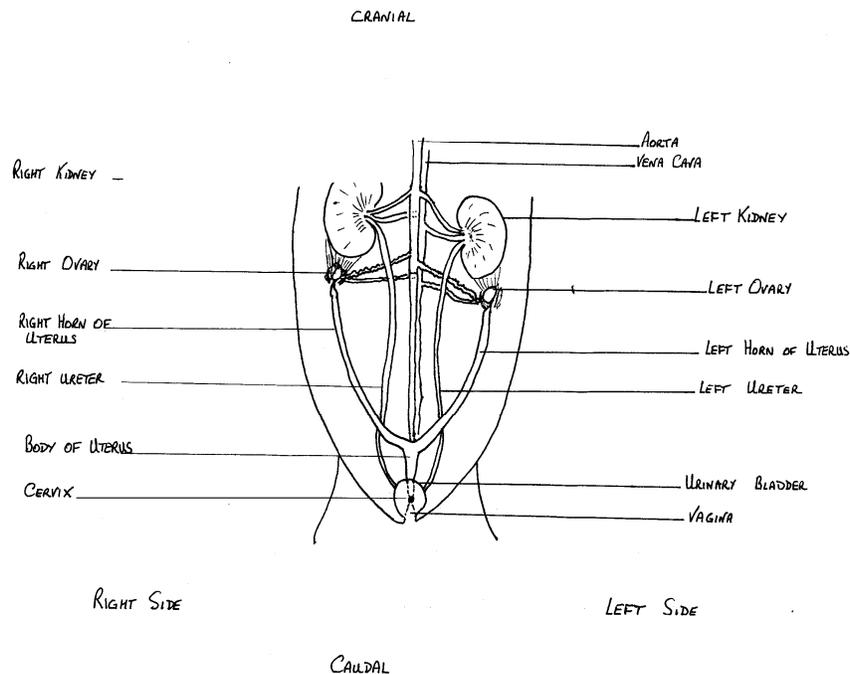


Diagram of Female Surgical Anatomy viewed from Ventral Aspect

We believe that the only logical and professional method of sterilising bitches is by complete ovariohysterectomy. This is because of the risk of pyometra if only the ovaries are removed. Tube ligation, as practiced in human gynaecology, has no place in veterinary medicine since the bitches will continue to come into season with the attendant nuisance this creates, and the risk of pyometra as the uterus remains under hormonal influences. Two common surgical approaches are possible to achieve complete ovariohysterectomy, via a flank incision, or via a ventral mid-line incision.

## **FLANK APPROACH - ADVANTAGES AND DISADVANTAGES**

### Advantages

1. Easy to check the wound and to apply any topical medicine in fractious animals.
2. Wound are of three separate muscle layers each individually sutured (catgut can safely be used in this site). Wounds are not under the weight of abdominal contents.
3. Less tension in incision area and increased vascularity can reduce healing time.
4. In young lean animals the spay can easily be performed through a very small incision.
5. Animals can be released earlier than with midline.

### Disadvantages

1. Cutting through the 3 muscle layers can cause bleeding which may be sufficient to obscure the surgical field and can lead to increased risk of post-operative infection.
2. Recovery of a dropped or bleeding ovarian stump may be difficult.
3. It may be difficult to expose the opposite ovary and uterine bifurcation if the original incision was incorrectly placed.
4. Severe reactions to catgut can occur. Degradation sometimes produces swellings within the muscle layers. These need to be monitored, as they are a favourable site for infection.
5. Approach more traumatic (i.e.: through three muscle layers) than midline, and therefore increased post-operative pain is possible.

## **MIDLINE APPROACH - ADVANTAGES AND DISADVANTAGES**

### Advantages

1. Incising through fascia and connective tissue causes very little bleeding.
2. Less trauma to abdominal wall - decreased post-op pain.
3. If any haemorrhage occurs or a pedicle is dropped, it is easily possible to extend the incision a little to locate and clamp any bleeding vessel.
4. In operations requiring a longer incision, e.g.: pregnant bitches, pyometras, it is less traumatic than a flank approach. There is decreased bleeding, and also possibly less post-operative pain.
5. Minimal / no reaction to monofilament nylon suture used in the abdominal wall.

### Disadvantages

1. The linea alba, through which the midline incision should be made, may be difficult to identify. Failure to locate the linea alba and making an incision paramedially effectively removes all the advantages of this approach.
2. The wound is more inaccessible and thus harder to check in fearful animals.
3. The risk of wound breakdown and herniation is increased.
4. Dogs must be kept longer to allow adequate healing, as the healing rate of the fibrous linea alba is slower than muscle because of its more limited blood supply.
5. Nylon remains in the body for the life of the dog and can become a focus for infection.

## **CRITERIA FOR CHOOSING APPROACH**

The choice of approach is influenced greatly by the surgeon's experience and preference. As the HIS ABC programme has progressed the flank approach has become the preferred surgical approach in all but the most exceptional cases.

A midline approach may be preferred by some surgeons in:

- 1) Heavily pregnant bitches (see earlier)
- 2) Pyometras
- 3) Fat and heavy, well-muscled bitches, such as pet dogs.

It is probably true that the best approach is that which the surgeon is most experienced in. The success of all surgery depends on strict asepsis and careful tissue handling.

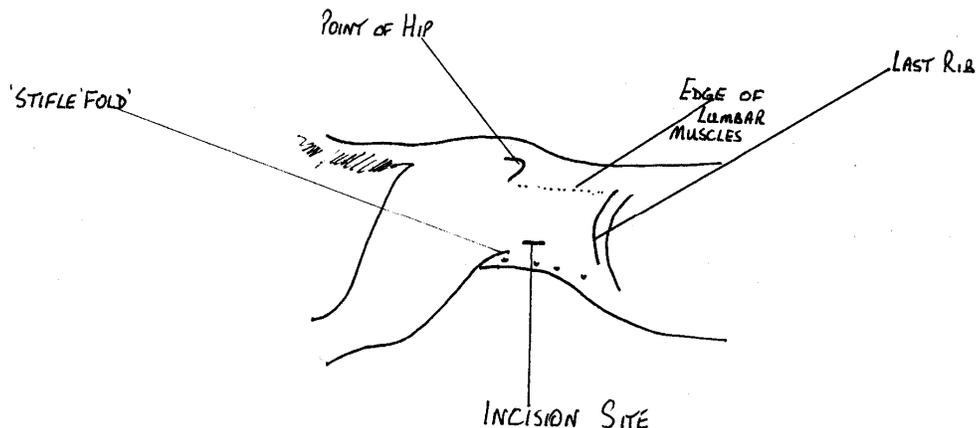
An absorbable suture, e.g. chromic catgut should be used for all ligatures. We use chromic cat gut size 5 or 6 metric (1 or 2 imperial). Choice of size of suture material depends on the size of the vascular bundle being ligated. Catgut no. 2 is used for adult bitches, but no.1 for puppies and adolescent animals.

## FLANK SPAY TECHNIQUE

### Approach

The dog is positioned lying on its left side and abdominal cavity is entered via the right flank with the ventral aspect of the dog towards the surgeon. In adult bitches the incision is made about 4 cms behind the most caudal curve of the last rib, parallel to the spine and about 9 cms ventral to the transverse processes of the lumbar vertebrae. The incision often falls at the cranial end of the fold of skin connecting the stifle to the abdominal wall. In young bitches (under 6 months) the incision is placed more caudally. Failure to do this in young dogs results in difficulties in exteriorising the uterine body near the bifurcation/ cervix to allow identification and removal of the second uterine horn.

Note: The right ovary is more closely adhered to the right kidney and body wall than the left ovary and thus easier to exteriorise if incision is made in right flank.



Location of Incision Site for Flank Spay

Tissue incised -

- Skin;
- Subcutaneous tissues/fascia;
- External abdominal oblique muscle;
- Internal abdominal oblique muscle;
- Transverse abdominal muscle to which the peritoneum is often attached.

The skin is cut with a scalpel. Subsequent layers are separated using scissors and blunt dissection. Incising the 3 muscle layers can cause haemorrhage. Splitting the muscles along their fibres reduces bleeding, causes less trauma and faster healing, but

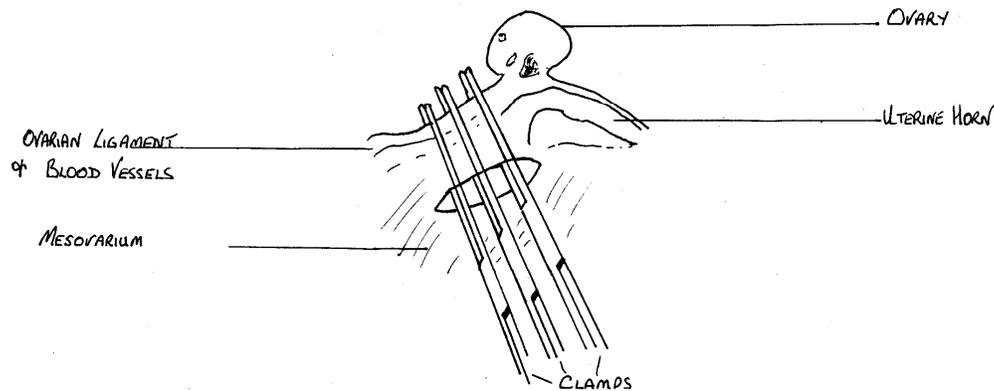
may result in a smaller aperture through which to work. Inexperienced surgeons often find gaining entry to the abdominal cavity the most challenging part of this approach. Cutting these muscle layers is easiest if they are isolated using Allis clamps by an assistant and if the surgeon's scissors are held perpendicular to the body wall.

### Spay

The right uterine horn is located with spay hook. This is easiest done if the hook is inserted along the inside of the right abdominal wall, remaining in contact with the body wall and heading towards the right kidney/ cranial lumbar region. If the hook is then rotated and removed carefully the uterus is often within the hook. The horn is elevated so that the ovary is grasped between the thumb and index finger of one hand, the body wall can be depressed to reduce the distance that the ovary must be removed. The suspensory ligament is stretched or broken with the second finger of that hand. When breaking the suspensory ligament direct the tension caudally to protect and avoid tearing the ovarian vascular complex and subsequent haemorrhage.

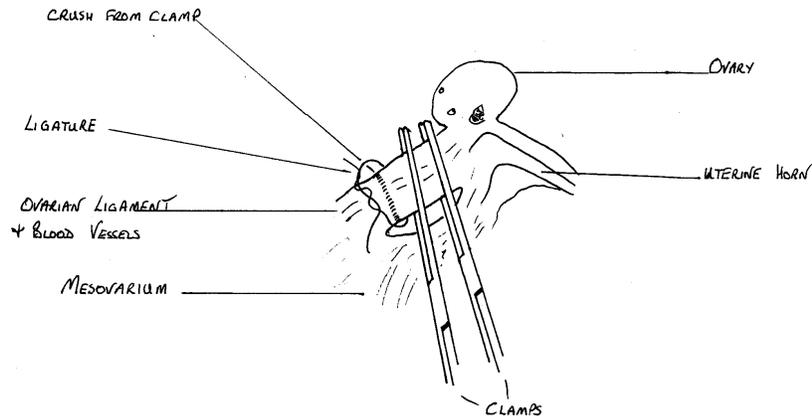
Locate the ovarian vascular complex. Make a window in the mesovarium immediately adjacent to the vasculature.

The ovarian vascular complex is clamped with artery forceps.



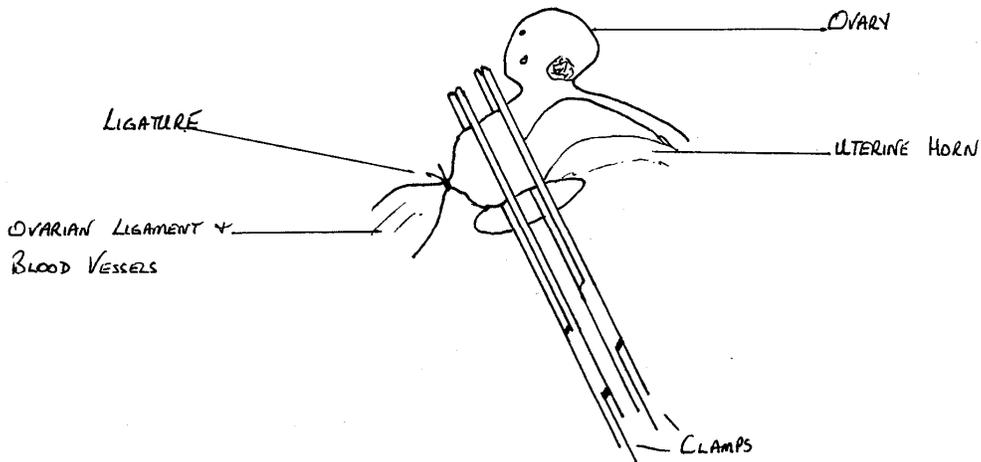
### Clamping the Ovarian Blood Vessels

The surgeon should keep hold of the ovary when applying the first clamp to ensure the clamp is placed below the ovary and thus that entire ovary is removed. Failure to remove all ovarian tissue may mean that the dog continues to show oestrous behaviour even if it can not become pregnant. This is undesirable.



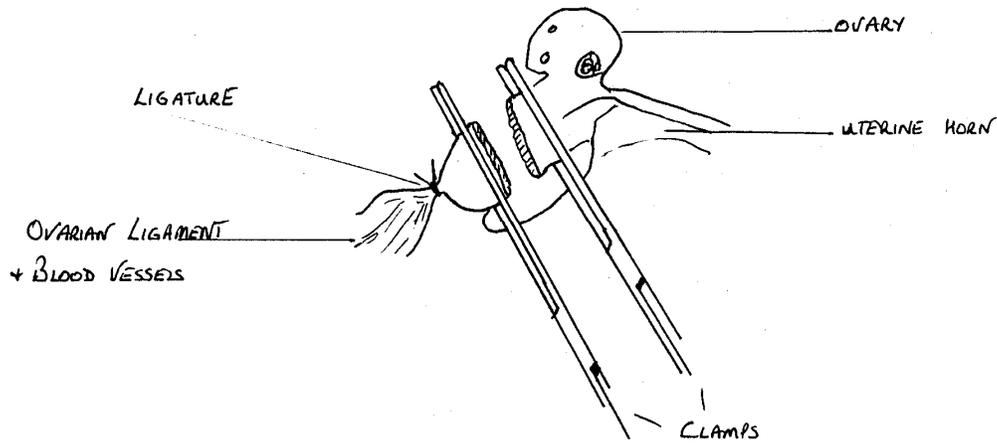
**Placing Ligature into Crush caused by Clamp**

A circumferential suture is placed loosely around the pedicle at the clamp furthest from the ovary. The clamp is removed as the suture is tightened so that the suture lies in the groove of the crushed tissue created by the clamp ensuring greater ligature security. A transfixing suture (i.e. one where the suture material passes through the tissues rather than just around them) may be placed proximal to the ligature. This may be prudent in very fat bitches.



**Securely Tightened Ligature in place around the Ovarian Vessels**

The ovarian stump is cut with scissors between the 2 clamps closest to the ovary. The excised ovary and ovarian bursa are examined to ensure the entire ovary has been removed.

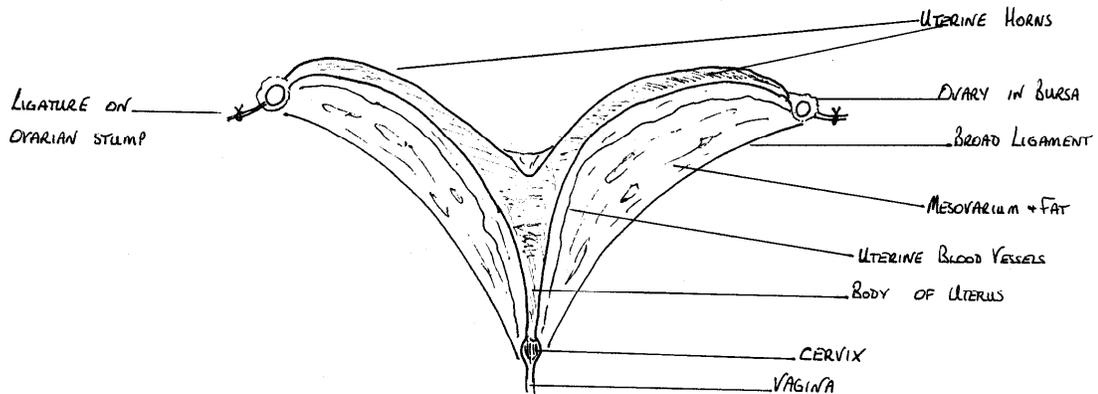


**The Ovarian Vessels are cut from the Ovary**

The stump is grasped (without grasping the ligature) with thumb (rat toothed) forceps. The clamp on the stump is released. The stump is inspected for bleeding. If none occurs the stump is replaced in the abdomen. Care must be taken to ensure that a section of body wall has not been inadvertently incorporated in the ligature during tying.

The second (left) uterine horn is located by following the right horn distally to the bifurcation. Repeat procedure as for first ovary.

Both ovaries and both horns of the uterus are exteriorised, along with the attached mesovarium and associated uterine blood vessels.

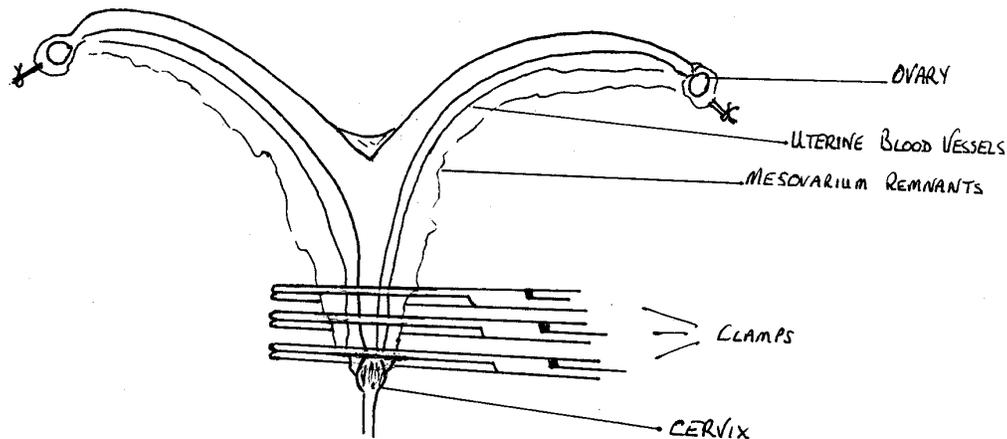


**The Exteriorised Uterine Horns and Ovaries**

A window is then made in the mesovarium adjacent to the uterine artery and vein, and much of the mesovarium, broad ligament and associated fat is broken from the uterus and ovary. This is best done in a controlled manner towards the now free ovary. This procedure is done with both uterine horns. The remnants of the mesovarium, broad ligament and associated fat are returned to the abdominal cavity. Following this, the uterus is seen separate from other tissues except from the vascular structures which run parallel to the uterus.

The uterine body is exteriorised. The cervix is located, though it often can not be visualised. Various techniques may be used to ligate and remove the uterine body depending on size of uterus and the surgeon's preference. The triple clamp technique is generally used (as for ovarian attachments). Care is required, particularly with bitches in season or which have recently whelped, as the uterine tissue may be friable and the clamps may cut rather than crush the tissue. In these cases allowing a generous space between the clamps may reduce this risk.

The three clamps are placed on the uterine side of the cervix. In smaller / non-pregnant dogs it is possible to mass ligate uterine vasculature with one ligature as for ovarian vascular pedicle.



**Clamping of the Uterus and Blood Vessels just above the Cervix**

In pregnant dogs where the uterine vessels are of greater size, the uterine arteries and veins can be individually ligated between the cervix and the closest clamp. A circumferential suture is loosely placed around this clamp, the clamp is removed, and a suture tightened in to the groove of crushed tissue. A transfixation suture can also be placed if desired. This will ensure greater security of the ligature.

In pregnant or fat dogs it is sometimes easier, and may result in a smaller surgical wound than otherwise, if the uterine body is ligated and removed (as described above) before the second ovary is removed.

The uterine body is severed between the remaining 2 clamps. The uterine stump is then evaluated for bleeding and returned to the abdomen. In cases where the uterine stump is very large, or if there is evidence of intra-uterine infection the stump may be oversown using catgut in a Lambert's or Cushing's suture pattern, and/or a piece of mesentery wrapped around it.

## Closure

On abdominal closure each muscle layer is sutured individually i.e. 3 separate layers (the peritoneum is incorporated with the closure of the transverse abdominus muscle). In puppies the peritoneum, transverse abdominus and internal abdominal oblique are sutured with one suture and the external abdominal oblique separately with another suture.

The suture material used is chromic catgut; size 5 metric (1 imperial) in all dogs. Vicryl is good for this site but expense precludes use.

For longer incisions i.e. more than 2 cms in length, a continuous suture pattern can be used, such as Ford interlocking.

For smaller incisions i.e. up to 2 cm in length, a horizontal mattress suture may be used. We have found the horizontal mattress suture to cause far fewer visible swellings, probably due to the reduction in the amount of catgut in the muscle layers.

When suturing the abdominal muscles, it is easier to work with an assistant who gently isolates the individual muscle layers.

Allis tissue forceps may be placed on the very edge of the muscle layers but it is better to use Babcock forceps or rat tooth forceps as these are less traumatic to the tissues.

The subcutaneous tissues are closed, tension and dead space eliminated with 3-0 catgut in either a horizontal mattress pattern or a continuous pattern. The skin is sutured using 3-0 Vicryl with swaged-on needle, in a continuous intradermal suture. The adoption of intradermal sutures has significantly reduced the recovery times of dogs in our programme. This technique requires careful attention to aseptic techniques. The suture and knots are so arranged as to be buried. The initial suture is placed inverted so as to bury the knot. The concluding knot is a chain (Aberdeen) knot that is drawn through the incision beneath the skin.

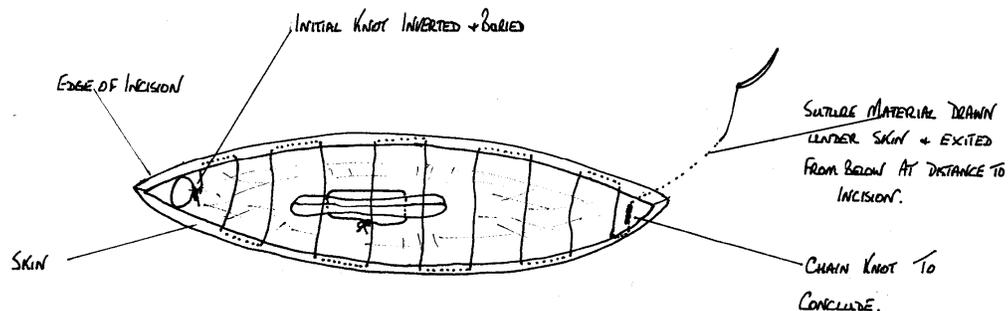


Diagram of intra-dermal suture

## MIDLINE SPAY TECHNIQUE

### Approach

Tissues incised - skin;  
subcutaneous;  
linea alba – white, fibrous tissue plane (aponeurosis);  
peritoneum.

If electing to perform surgery through a mid-line approach it is important to ensure that it is the fibrous linea alba which is incised and not the adjacent muscles otherwise the advantages of this approach are lost. The incision extends from about 1 inch caudal to the umbilical scar caudally, although some surgeons begin the incision at the caudal border of the umbilicus.

### Spay

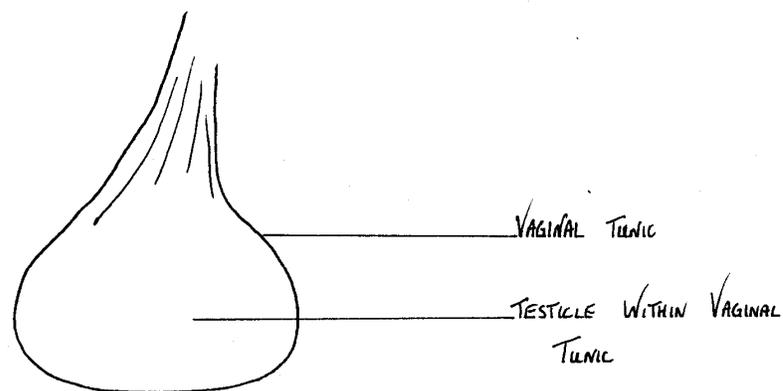
Routine spay is performed as described above for Flank Spay Technique.

### Closure

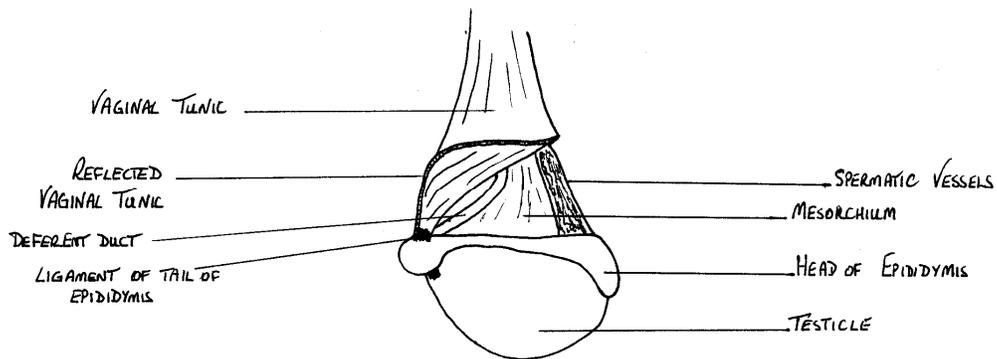
Abdominal closure is in 1 layer. A simple interrupted suture pattern is used in the linea alba. Sterile, heavy gauge, monofilament nylon is used. Subcutaneous tissue and skin are closed routinely as before. Cat gut can not be used to close the linear alba since it degrades too quickly to support the slower healing fibrous tissues of this structure.

## CASTRATION

### MALE SURGICAL ANATOMY



Testicle removed from Scrotum within Vaginal Tunic

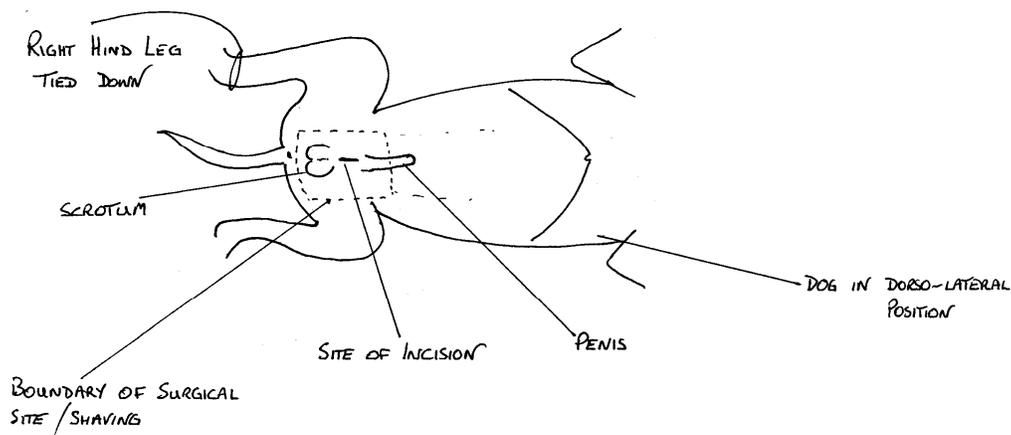


### Testicle and Associated Structures after incision of Vaginal Tunic

Initially the programme concentrated on female dogs. Recently we have begun sterilisation of young male dogs. Adult males are not castrated as checking the wound is very difficult, our experience has been that considerable scrotal swelling and discomfort arises causing longer recovery times, with consequences for kennel occupancy. The changes in behaviour after castration will also be minimal. Pre-pubescent males only are castrated.

### Castration technique

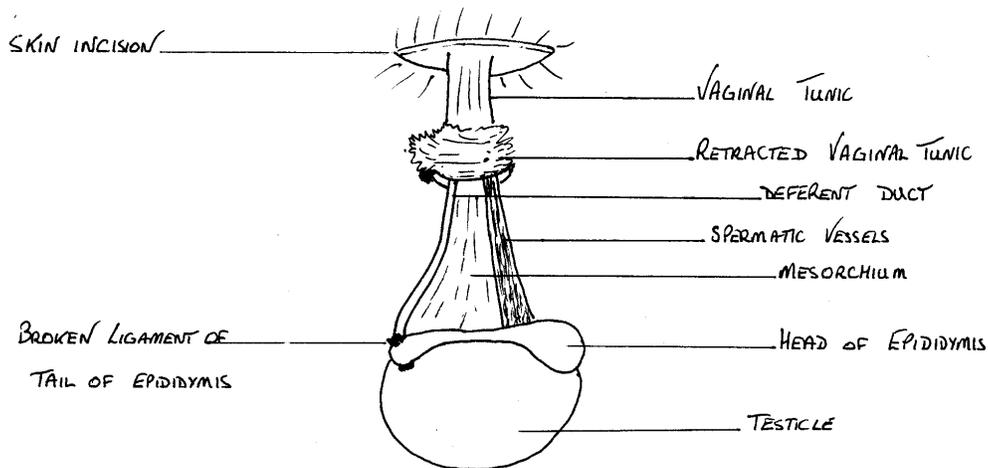
Males are positioned in dorso-lateral recumbancy facing to the surgeon's right. The right hind leg is secured so that the pelvic region is exposed and the right stifle is not overlying the surgical site. The dog can be placed in dorsal recumbancy but this requires support at the thorax/axillae and also the straightening of the catheterised foreleg to ensure the catheterised vein is not occluded at the flexed elbow. These positionings and adjustments take extra time. The scrotal, penile, inguinal and perineal regions are shaved and prepared for surgery as described earlier.



Site of Incision for Castration.

Males are castrated through a single pre-scrotal incision. One testicle, usually the lower testicle, is advanced cranially and the skin incision made over the tensed testicle. The sub-cutaneous tissues, and the tunica dartos and external spermatic fascia are incised. The testicle within the spermatic sac is then grasped and pulled free. The spermatic sac is then excised at its most ventral part. The vaginal tunic is reflected revealing the testicle and associated structures.

The vaginal tunic is separated from the tail of the epididymis by breaking the ligamentous attachment there. This leaves the testicle connected by only the spermatic vessels in one bundle and the deferent duct connected by the mesorchium.



**Retraction of the Vaginal Tunic**

The exact method of removal of the testicle varies between surgeons and also depends on the size of the testicle and its associated structures. The deferent duct and the spermatic vessels may be clamped and ligated as described for the ovarian attachments (using the 'triple clamp' method). This is the method of choice for large, well-developed testicles. For smaller testicular structures it is possible to tie the blood vessels and the duct to each other to ensure haemostasis once the deferent duct has been broken from the epididymis.

Once the vessels are ligated the testicle can be severed from them. The spermatic vessels usually retract considerably once this has been done.

The contralateral testicle is now advanced into the skin incision and an incision made in the tissues surrounding the testicle as before to allow the testicle within the spermatic sac to be grasped and exteriorised. This testicle is then isolated and excised as before.

Suturing involves closing all dead spaces with a continuous 3/0 cat gut suture. It is considered good practice to place this suture through the vaginal tunics of the two testicles to ensure the potential opening into the abdominal cavity is closed and also to

incorporate the septal midline tissues. The skin is closed with an intra-dermal suture as described for skin closure in bitch spays.

Considerable post-operative bleeding, bruising and swelling are common especially in larger dogs. This may be further exacerbated by the dog licking at the area.

## **SUTURE MATERIAL**

Choice of suture material depends not only on the intrinsic qualities of the material, such as initial strength, strength over time, body reactions etc., but also on cost, availability and surgeon's preference.

At HIS individually packaged suture material is used rather than cassettes, as sterility is more certain, and cassettes of suture material common in the U.K. are not readily available here.

Suture Material	Mode of Degradation	Body Reaction to Material
Chromic Catgut	Phagocytosis and enzymatic degradation	Moderate to severe depending on individual dog
Polyglactin 90 (Vicryl)	Hydrolysis	Slight
Monofilament Nylon	Not absorbed. Remains in tissues for ever	Nil to slight, but can act as a focus of infection.

### 1. In the flank approach:

Catgut is used in the muscle layers of the flank approach, as it is cheap and satisfactory in this site, where there is little tension and a good blood supply. Visible tissue reactions (seromas, swellings) can occur but these are not a serious problem. However some dogs seem particularly prone to developing reactions to cat gut. Animals that react so as to require additional corrective surgery should not be sutured with cat gut again. Vicryl will often suffice instead.

### 2. In the linea alba (Midline Approach):

In the midline approach, heavy gauge monofilament nylon may be used. It is strong, effective and cheap. It is not absorbable and stays in the body for the life of the dog, but causes little body reaction. However it should only be used in sterile conditions as it can otherwise act as a focus of infection.

Vicryl (polyglactin 90) is an absorbable suture material that retains its strength for long enough to be safe for midline use. However it is expensive but we now use it routinely for this purpose (as few midline incisions are now used). PDS if available is an excellent suture material for this site

Catgut is not recommended for use in the midline. The abdomen is closed in one layer and this is under the weight of the abdominal contents. Catgut may lose its tensile strength too quickly to be successful in this site. It is initially strong enough but does not always retain its strength for sufficient time to ensure safe healing. Also the rate of degradation greatly increases in the presence of infection (in this case it may even break down within days). Wound breakdown and herniation may occur in a proportion of cases if catgut is used in this site. This is more likely to occur in a dog that is active in the early post-operative period.

3. In the subcutaneous tissues:

The subcutaneous tissue is closed with 3 metric (3-0 imperial) catgut in a simple continuous pattern. These sutures are under little tension and serve primarily to eliminate dead space.

4. In the skin:

The skin is sutured with Vicryl (3 metric / 3-0 imperial). Whilst it is expensive, Vicryl is safe, effective and causes little tissue reaction. As Vicryl is an absorbable material with a constant rate of degradation dogs can be released with Vicryl sutures in situ.

The use of intra-dermal Vicryl sutures has significantly improved the recovery rate of dogs, and also reduced considerably the use of post-op antibiotics. The technique requires good aseptic conditions and some experience to perfect. Recently locally produced Vicryl has become available which is much cheaper.

ABC dogs are likely to be released before suture removal would be possible. For this reason an absorbable suture must be used. To release animals with non-absorbable skin sutures in place may result in later irritation, infections, and infestations with screw-worm.

## **CLINICAL COMPLICATIONS**

### **1. Haemorrhage.**

During the operation serious haemorrhage can arise from a number of places.

It may occur by tearing of ovarian vascular complex whilst stretching / breaking suspensory ligament. This can be avoided by stretching rather than breaking the suspensory ligament and doing so in a caudal direction.

Haemorrhage can result from tearing of uterine vessels by excessive tension on uterine body. This is particularly so when operating on pregnant bitches during exteriorisation of the uterus. Handling all tissues gently will reduce the risk of this, as will ensuring that the incision is of appropriate size for the uterus being removed.

Bleeding may happen when tearing other large vessels in broad ligament while stripping this off the uterine body prior to the clamping and ligation of the cervix. In the very few cases of post-operative exsanguination seen at HIS, bleeding from these other vessels (rather than the major ovarian and uterine vessels) has been the major cause. This danger can be avoided by individually ligating any large vessels (if

present, e.g. fat dogs) in the broad ligament and mesovarium. Controlled separation of the broad ligament from the uterus working from the cervix to the ovary also reduces the risk of haemorrhage from this source.

Ensuring all sutures are adequately placed and tied using proper surgeon's knots will help reduce the chance of intra-op and post-op haemorrhage.

Haemorrhage from muscles can be a problem, but will not normally be life threatening. With careful incision and dissection of each muscle layer it is often possible to see and thus avoid major body wall blood vessels. Clamping vessels with haemostats will usually stop the bleeding with time.

Bitches in oestrus at the time of spaying may bleed more than expected due to the effects of oestrogen on the clotting cascade.

Castration of large males often results in seepage of blood that can be very difficult to locate and stop. Many adult male dogs will show signs of post-op haemorrhage and swelling. This is one of the reasons why adult males are not included as part of the sterilisation programme. The risk of blood oozing in to scrotal space may be lessened if care is taken to ensure that the incision is closed closely incorporating the subdermal tissues into the sutures

## **2. Recurrent signs of oestrus / heat.**

Signs of oestrus result from functional remnants of ovarian tissue being left in the abdomen following an incomplete spay operation. The animal will still show signs of season. The surgeon must ensure all ovarian tissue is removed, by, for example, holding the ovary while clamps are applied, and by inspecting the excised tissue to check it contains the whole ovary.

## **3. Uterine stump pyometra.**

Uterine stump pyometra may occur if any portion of the uterus is not removed during the spay.

The last two points are amongst the reason that HIS veterinary surgeons can see no justification for sterilisation procedures such as tubectomy, or ovariectomy as opposed to the complete ovariohysterectomy performed at HIS.

## **IMMEDIATE POST-OPERATIVE CARE**

**1.** After sterilisation surgery the dog or bitch is placed in a warm area to recover from anaesthesia. This is only of concern in the winter months when dogs are allowed to recover in the sunshine. For most of the year the dogs are returned directly to their kennels.

If allowing anaesthetised dogs to recover in an open compound care must be taken to ensure that they do not fall prey to the attention of crows or other predators, and also

that they do not over heat if in direct sunshine. It is also necessary that each animal can be easily identified so it may be returned to the correct kennel. We do this by putting a small piece of tape on the animal's head on which is written its kennel number.

Small dogs/puppies are most at risk of hypothermia, even in moderate environmental ambient temperatures. Steps must be taken to keep these animals warm by using rubber mats, 'bubble wrap' plastic sheeting, warmed intravenous fluids etc.

Some authorities advocate administration of dextrose *i/v* or *per os* during or immediately post op to combat hypoglycaemia which can result from anaesthesia.

2. An insect repellent cream is applied (Odomos) around wound-site to repel flies and prevent maggot infestation. Jaipur is in a screw-worm fly (*Chrysomya bezziana*) endemic area. This is a primary myiasis fly that can be very troublesome particularly in the hot summer months.

3. Coloured nylon collars used to be fitted to all adult dogs passing through the programme. These enabled easy identification of the programme's dogs by both the public and staff. This probably helped considerably in making the public aware of our activities. However problems have been encountered with collars causing wounds to dogs, and their use has been discontinued. When placed they were loose fitting, bright coloured, nylon webbing riveted in place around the neck. In the initial stages of any programme the benefits of a clear method for the public to identify the programme's dogs may out-weigh the disadvantages caused to a few dogs.

## **GENERAL POST OPERATIVE CARE**

Dogs are checked by a veterinary surgeon including physical examination of wounds and ear notches at least once daily. Lay staff are encouraged to bring matters of concern to the attention of a veterinary surgeon whenever these occur. To help with the daily checking, a simple 'kennel checklist' is used. Each checklist (see appendices) lasts for one week and provides space for all kennels and their occupants. Comments on the condition of any dog can be written on the checklist. They are also written on the kennel card. We do not consider it professionally appropriate to delegate checking of dogs to non-professional staff, though as our lay staff have become more competent they do participate more fully in daily dog checking.

Should an ABC dog die while in our care, or indeed after release, we endeavour to perform a full post mortem examination to determine the cause of death. This allows us to learn from such experiences and improve the quality of surgery and care provided.

It is important to get the animals back to their niches on the street as soon as possible in order to minimise disruption to social order. There is thus a compromise between recovery from surgery and release date. The most certain way of reducing recovery times is by competent surgery of a high standard with all regard to asepsis, gentle tissue handling and other established good surgical techniques, coupled with good dog handling and kennel management. There can be no predetermined release time for the dogs; their individual release depends on each dog's recovery from surgery. Help in

Suffering does not agree with same day release for most street dogs in an ABC programme where dogs come from a typical urban environment. The majority of dogs in the Jaipur setting do not have referral household who may be relied upon by the ABC project to care for the animal during its recovery from surgery.

When considering releasing dogs it is important to remember that they live in a hard, demanding and very dirty environment. Complications can take a few days to become obvious. Screw-worm fly can strike at any time on any damaged tissue and will very quickly turn a small wound into a great mess.

With these considerations in mind, HIS veterinary surgeons can not agree with the release of animals immediately following surgery as happens, especially with male dogs, in some programmes. See notes on same day release in the Appendices

The current, average releasing times from our programme are 3.49 days for females (including female pups) and 2.39 days for male dogs (mainly puppies). 7.4% of animals stayed for 5 or more days after surgery. Only 1.2 % of dogs (mainly females) stayed for more than 10 days prior to release. It must be stressed however that these figures are averages; should any animal need a longer time to recover then that animal is not released until veterinary opinion indicates it is fit for release.

These figures have reduced steadily as the programme has developed and progressed, and as the experience of all staff has increased. In 1998 the average releasing time for bitches was 6 days. The introduction of intradermal suture pattern, made possible by scrupulous attention to sterility and surgical technique, has been a major factor in the reduction in recovery times.

Releasing times vary throughout the year due in part to the different populations of animals entering the programme, and in part to the weather. Our shortest releasing periods are always in the months of high summer when the temperature can be over 45°C and humidity very low. Longer recovery times are seen during the monsoon when humid conditions and more moderate temperatures make wound healing slower, and also during the whelping season (October and November) when many bitches are pregnant when spayed.

## **RELEASING**

When ready for release the dogs are loaded back into the vehicle, usually by hand as described in the catching section, but if necessary using the 'sack and loop' method. The dogs are given a final health and identity check as they are loaded. Previously if releasing was to occur in several areas the dogs were marked by coloured paste (Holi powders) according to area. These colours are then noted on the releasing form that the team takes with them. Recently tape with kennel numbers written on has been applied to the dogs' foreheads to aid identification during release. On most occasions the dogs are also identified by area to the senior staff of the releasing team

The dogs are then driven back to the area from which they were captured. When a suitable spot, usually a quiet back street in the release area is located the dogs for that area are let out. We usually find the dogs jump out of their own accord though if the vehicle is fully loaded it can be quite difficult to ensure that dogs are released

appropriately. We have considered using a 'shepherd's crook type devise to fetch dogs from the back of the jeep to the vehicle's door.

It is important to release the dogs in a quiet street and avoid busy main roads as the dogs are disorientated. It is best if only two dogs are released at a time at the same spot in order to minimise aggravation amongst dogs, and furthermore to minimise the objections of the general public. The dogs are often salivating and disorientated after their journey and the public has been concerned that the released dogs were rabid. Education of the public is necessary to overcome these objections. Feeding dogs immediately before they are to be released exacerbates this problem, and tends to cause considerable vomiting in the vehicle.

It can be quite tricky to ensure the correct dogs are released in the correct location without others escaping too. Some dogs can be scruffed and pulled clear. Others may need to be pushed nearer the gate using rods so they may be released.

Releasing is made easier and more efficient if catching is planned in an orderly fashion. This means most dogs for releasing will have come from the same approximate area since dogs that enter the programme together tend to be released together. Releasing of dogs into their correct areas can be very difficult and very time consuming, if the dogs to be released are from many areas scattered throughout the city. Making releasing easy helps ensure that it is done correctly with as few misplaced dogs as possible.

## **ABC RECORDS GUIDE**

The recording system at HIS has evolved during the course of the programme but is largely unchanged from that set in place at the beginning. We believe that it essential to keep proper and honest records so that the programme is seen to be functioning in a professional manner, so that the public might have faith in our ability to care for street pet dogs, so that any problems can be easily identified and addressed; and so funding agencies can be confident that their money is properly used.

## **FORMS**

Copies of forms referred to in this section are shown in the appendices.

## **ADMISSIONS**

1. On arrival of dogs an Admission Form is completed. ID number follows on from the last number in the ABC register.
2. Details are inserted from the Admission Form - a) in the ABC register; b) on kennel cards.
3. Kennel cards are placed in the card holders provided on each kennel door.

## **OPERATIONS**

1. An Operations' Schedule is prepared from the ABC register. This lists the ID and kennel number of each dog, its sex and a brief description.
2. The kennel card goes with the dog from the kennel to the preparation room then the operating theatre and back to the kennel after operation. Operation particulars and comments are inserted in the Operations' Schedule and kennel card after each operation. Once the surgery is completed the Schedule is returned to the office together with the marked kennel cards of dogs that were humanely destroyed or that died.
4. The details of operations, deaths and euthanasia cases are inserted from the completed Operations' Schedule into the ABC register.
5. The completed Operations' Schedule and any returned kennel cards are filed away and the day's operations are added to the operations' tally list.

## **RELEASES**

1. The veterinary surgeons advise which dogs are ready for release using the Kennel Checklist.
2. The Release Form is filled in according to the ABC register with the details of the dogs to be released.
3. The letter 'R' is written on the kennel cards of dogs that are to be released to aid those releasing. The dogs are loaded as described earlier.
4. After the ABC staff have left the shelter with the dogs, the kennels are checked to ensure that all dogs suitable for release have in fact been taken. The kennel cards are retrieved.
5. The details in the ABC register are completed and the release form and kennel cards are filed away.

## **APPENDICES**

1. Anaesthetic Regimes
2. Rabies vaccination and prophylaxis
3. Canine Rabies
4. Counting
5. ABC Kennels: Dimensions and Design Considerations
6. Same Day Release
7. ABC forms
8. ABC summary numbers/data

## 1 Anaesthetic regimes

Devised by R.D. Morris, B.V.Sc., Cert.V.A., M.R.C.V.S.

### Dog

#### 1) Sedation

Xylazine (20mg/ml) Heavy sedation 1ml/10kg. Light sedation 1ml/20kg. Give i/m or i/v. Use only in fit dogs. This may induce vomiting.

#### 2) Premedication

For all fit dogs give a premed of Triflupromazine (20mg/ml) at dose of 1ml/10kg. Give i/m.

If unwell give ½ml per 10kg.

#### 3) Analgesia

For an excellent practical summary of recent advances in analgesia please refer to **The Science and Art of Analgesia** by S.Z. Perkowski and L.A. Wetmore. In: Recent Advances in Veterinary Anesthesia and Analgesia: Companion Animals: Available free at <http://www.ivis.org/newsletter/archives/oct06/oct2306perk.htm> (though free registration is required to view the article).

It is imperative that careful consideration is given to pain relief in all animals undergoing surgery. It is always better to give analgesic agents before the onset of painful stimuli such as surgery.

**a. Pentazocine** (30mg/ml) **1ml/15kg**. If procedures are going to be very painful then use this opioid. This takes 15 minutes to work and can be used before (as premed) or after op and can be repeated after 4 hours if necessary. Give i/m. Do not use in cats.

It is always better to give before op. as pain relief will be better.

**b. Diclofenac** (25mg/ml) 1ml/20kg. This drug was used for post op pain relief. For best results give before causing pain. Do not use for more than two days and do not use with other NSAIDs or steroids. These will increase the risk of gastro-intestinal disease. Diclofenac residues have recently been linked with a dramatic decline in the Indian vulture population. The routine use of diclofenac at H.I.S. has been discontinued. In its place the NSAID meloxicam is now used.

**c. Meloxicam** 0.2 mg/kg s/c once only for 1 day (then 0.1 mg/kg by mouth or s/c if subsequent pain relief is necessary on following days). The preparation we use (Melonex) can be given i/v at the above dose; and is given by this route immediately after the initial bolus of anaesthetic agent.

**Adverse effects and contraindications:** As meloxicam preferentially inhibits the COX-2 enzyme adverse effects are less severe than those seen with some other NSAIDs and this is a good reason to use it. Adverse effects associated with NSAID use include gastrointestinal irritation and ulceration, renal papillary necrosis, particularly if hypotension, dehydration or other nephrotoxic drugs are present. These effects are rarely reported following the use of meloxicam. Do not administer meloxicam to pregnant animals if the pups are intended to survive (i.e. there is no problem using it when spaying a pregnant bitch).

Meloxicam should not be used with corticosteroids or other NSAIDs (increased risk of GI ulceration). The concurrent use of meloxicam with diuretics or aminoglycosides (such as gentamycin) may increase the risk of nephrotoxicity.

#### **4) Anaesthesia**

Anaesthetised animals lose the ability to regulate their body temperatures. As a result anaesthetised animals may become very cold. This is especially the case with smaller patients. Always keep anaesthetised animals warm and never put on a cold table or floor without rubber mat. After the operation the patient should be wrapped up in bubblewrap if very cold weather. Warm i/v fluids should be used.

##### **a. Thiopentone 2.5%**

Give about 4ml/10kg and top up at 1ml/10kg each time needed. Must give i/v. Perivascular injections cause sloughing, and such injections should be thoroughly irrigated to prevent this.

Test the depth of anaesthesia with the palpebral reflex and jaw tone.

##### **b. Propofol**

Give at 4ml/10kg intravenously. Be aware that dog may stop breathing for a short while after induction, it is thus better to intubate the dog and, using a bag, give 4 puffs a minute until it starts breathing again. This can be topped up safely at 1ml/10kg as needed. Note will recover very quickly from anaesthesia.

##### **c. Ketamine in combination with xylazine or diazepam**

When using ketamine for anaesthesia the dog may still swallow or blink briskly. Ketamine has some central acting analgesic effects and is thus preferred amongst anaesthetics.

Note that Xylazine has insufficient analgesic effects to permit surgery to be performed without other agents such as ketamine. To do so would be unprofessional and would be a serious failure of animal welfare.

**Xylazine and Ketamine** (xylazine 20mg/ml) (ketamine 50mg/ml) this gives 20 minutes surgical anaesthesia and fast recovery time. It can be used on all dogs and is particularly useful for puppies.

Use 1/3 volume of xylazine to 2/3 volume of ketamine in same syringe (in a 10ml syringe put 3 ml xylazine and 6 ml ketamine).

#### *Dose*

**Small Puppy:** administer 1 ml mixture to small puppy IV and flush catheter with saline. Wait 1 ½ minutes then if needs more top up at ½ ml per time (waiting 1 ½ minutes between each top up).

**10kg dog 2.0ml** wait 1 ½ minutes then top up with ½ ml if needed

**20kg dog 3.0ml** wait 1 ½ minutes then top up with ½ ml if needed

**30kg dog 4.0ml** wait 1 ½ minutes then top up with ½ ml if needed

If in doubt with larger dogs give ½ or 2/3 dose to start with and watch the effect.

#### **Diazepam and Ketamine.**

Two main uses:

1. Ear notching dogs or short procedures that need to be done daily for a few days(i.e. multiple anaesthetics)
2. Old or weak dogs.

Diazepam (5mg/ml) 1ml/10kg and ketamine 1ml/10kg mix in same syringe and inject as mixture i/v.

If dog is fit may need 4 ml/20kg of the mixture.

If dog is very ill try 2ml/20kg of mixture, wait 1 ½ minutes and top up with 1 ml if necessary.

#### **Cat**

##### **Xylazine and Ketamine**

Xylazine 0.1ml per 2kg and ketamine 1ml per 2kg.

Give i/m

Should give xylazine at least 10 min before ketamine

Do not give ketamine without xylazine cover first.

#### **Rabbits**

Ensure that theatre is very warm and that the rabbit is kept very warm and in a quiet environment. Do not put the rabbit on bare table; put a rubber mat below it.

In recovery (which takes about 2 hours to sit up and about 5 hours to look fairly normal). Wrap the rabbit up in a little bubblewrap jacket by putting three legs through the corners so it can not come off.

### **Premedication**

ACP 0.5ml and Pentazocine 0.3ml, (for approx. 1.5kg rabbit) mix in same syringe (2ml syringe ok) and give Intramuscularly, at the same time rub both ears with local anaesthetic gel plus the operation site.

Wait 10 minutes

### **Anaesthesia**

Then give via the lateral ear vein (do not use the central vessel as this is the main artery and the end of the ear may slough in a few days) using an insulin syringe.

**0.8ml Ketamine and 0.2ml Diazepam**, give half the dose first and check still breathing then give the rest. Give over 1 minute.

Use the second ear for top up.

Top up anaesthesia use diazepam Intravenous in insulin syringe, give in 0.1ml increments not more than twice.

### **Intubation**

This is not done routinely at HIS, but is used in dogs that are old, sick, may vomit or are otherwise compromised etc. While a range of sizes is ideal we manage generally with a size 7 or 8 tube. Tubes may be expensive but these are often available from hospitals. Tubes with inflatable cuffs are ideal, but un-cuffed tubes also serve the purpose. Practice is needed in placement of tubes. Practice and training at intubation can be done on carcasses of dogs humanely destroyed for other reasons. Initially it may be useful to extend the mouth of such dead dogs with caudally directed incisions at the commissures of the lips so that the epiglottis and other laryngeal structures may be better visualised. An air bag and appropriate connections are needed so respiration can be performed manually if necessary. Practice at, and training, in anaesthetic emergencies (i.e. those animals that stop breathing, and or whose heart stops) is essential. At HIS we use 5 manual heart compressions to one manual respiration. This equipment and training has justified itself on a number of occasions. The placement of tubes in dogs undergoing prolonged anaesthesia (for non-ABC surgery for example) is to be encouraged

The intubation of cats is more difficult than cats and is not done routinely at HIS on the few cats anaesthetised.

## 2 Notes on Rabies Vaccination and Prophylaxis

### a. Vaccination of Staff.

In a rabies endemic area it is **ABSOLUTELY IMPERATIVE** that all staff who come in contact with street dogs are kept fully vaccinated against Rabies. The WHO guidelines advise a pre-exposure prophylactic schedule of three injections of tissue culture derived vaccine of good quality is used at Help in Suffering for all new staff. The injections are given on day 0, day7, and day 28. After this course annual boosters are given.

The WHO guidelines suggest a booster vaccination after exposure to an animal of unknown rabies status. Clearly this is impossible in the case of workers whose daily duties bring them into contact with unvaccinated street dogs and their various bodily fluids. Having received advice from international medical experts in this matter we give a booster vaccine to any staff who feels they have been exposed to a potentially rabid animal, and certainly to any staff who have been bitten, no matter how superficially, by any street animal of uncertain vaccine status. This is done regardless of the period of time since the last vaccination. The greatest risk to workers, including veterinary surgeons, drivers and managers in an ABC programme is inapparent exposure, and so immunity must be maintained at a high level to cover such exposure. As a consequence of this policy staff rarely receive annual boosters since additional vaccinations have been given in between as a result of possible exposure.

At Help in Suffering staff vaccination records are maintained by the veterinary surgeons to ensure a uniform and duly cautious approach is adopted.

Staff are trained to deal with animal bites in a thorough manner which itself lowers the risk from Rabies even in unvaccinated subjects. Any wound caused by an unknown animal should be immediately and thoroughly cleaned with soap or detergents. The wound is then rinsed with water before being thoroughly washed again in an iodine solution (usually povidine iodine). After rinsing with water once again, surgical spirit is then used to wash the wound a third time. If necessary further expert medical advice should be sought (N.B. In India many medical doctors are dangerously ill informed about the treatment of a potentially rabid bite. This may also be true elsewhere.). Serious bites, those near the head, and bites in people of unknown vaccine status should also receive injections both locally to the wound and systemically of human rabies immunoglobulin. (However this is often not available in areas of the world with the greatest Rabies risk.)

Not only are the above procedures followed to safeguard the health of staff, but it is also our contention that in an endemic area it is unreasonable and unrealistic to expect staff to handle dogs, which may be excreting rabies virus, in a humane way unless they can be assured that they are as fully protected as possible against Rabies and will receive careful attention should they be bitten.

### b. Vaccination of Dogs.

At Help in Suffering we use a good quality cell cultured vaccine to vaccinate dogs. The nature of the programme means most animals receive only one dose. This is given intra-muscularly since a recent review has suggested that immunity produced

from intra-muscular injection lasts longer than that from a sub-cutaneous injection. The manufacturers of the vaccine claim that a significant degree of protection is still afforded by a single injection of vaccine. This, they claim, last for 3 years. Such data comes from challenge experiments that are clearly not possible in man. There is some confusion, and a frequent criticism of ABC programmes is that they do not follow a re-vaccination regime, or WHO guidelines on dog vaccination in endemic areas. These guidelines advise yearly booster vaccinations, and the maintenance of certain levels of circulating Rabies antibodies in the dog. We believe that while annual vaccination of dogs would clearly be best, it is clearly not feasible in a large scale ABC programme such as that at Help in Suffering. However to counter the argument about revaccination we feel that the findings of the manufacturers and others that indicate three years of immunity is conferred on a very large percentage of dogs given one dose are most important. The confusion may arise because the WHO guidelines may be drawn up to ensure 100% protection for every dog as would clearly be desirable in the case of pet dogs. In the case of an ABC programme the fate of individual dogs is of lesser importance than the immunity levels maintained throughout the population as a whole. Given the probable short life expectancy of many street dogs we feel it is reasonable to believe three years' immunity in most individuals would lead to adequate levels of protection to the population as a whole.

### **3. Notes on Canine Rabies Infection.**

In an endemic area all dogs showing neurological signs must be treated with the utmost caution and suspicion. One of the most worrying things about canine rabies infection is that an infected dog may be excreting rabies virus in its saliva for 3-4 days BEFORE it shows clinical signs of the disease. Canine rabies occurs in two forms, furious rabies and dumb rabies. The furious form is said to be most common, but one has to wonder if that is because of under diagnosing of the dumb form, particularly in countries where pathological confirmation of diagnosis is difficult due to lack of facilities.

The furious form is the 'classical' rabies infection. Signs develop only for a few days and always result in death. There is a marked change in behaviour, with friendly animals becoming wary and scared, and normally cautious animals becoming unusually friendly and approachable. The bark of the dog may alter often to a high pitched bark. The dog may be irritable. Slowly the classical signs of furious biting, wandering etc. develop. Dogs have difficulty eating and drinking, but will often appear keen to try. Saliva may dribble from the mouth. After only a day or two in the furious stage the animal will become recumbent, but may still attack objects presented to it. Eventually it succumbs to coma and death.

In the dumb form symptoms are much less pronounced, and may be easily confused with other disease in dogs. There is a progressive paralysis starting as hind limb ataxia and progressing to recumbency. There may be difficulty in eating and drinking again with dribbling of saliva. Owners may believe that the animal has a bone in its throat at this stage. The jaw and eyelids may droop and the dog may be unable or unwilling to close its mouth. Recumbency, coma and death occur in 2-3 days normally.

The period between exposure and developing disease of either presentation may vary from a few weeks to many months. Typically it is between 2 and 8 weeks.

At Help in Suffering we occasionally see rabies cases in the animals in the ABC programme. Because we feel we can not undermine public confidence in the programme by releasing any animal that may become rabid we humanely kill all animals which give rise to a suspicion of rabies. Furthermore because it is impossible to determine if infection has occurred we humanely kill all dogs which have been in contact with a possible rabies case. (The only logical alternative to this course of action would be to kennel these animals for the entire incubation period that may be many months.)

Occasionally we are asked to kennel an animal to see if it becomes rabid. The maximum period of time between a potentially rabid bite and the animal's death is 10 days. Thus if a dog remains healthy 10 days after a bite then it is reasonable to assume that the animal has not got rabies. However we generally refuse to do this for several reasons. First, the prophylactic course of vaccination for a dog bite victim should not be withheld pending the outcome of the dog's confinement, but rather be started at the earliest possible opportunity after the bite. And secondly kennelling potentially rabid dogs within a busy animal shelter is seen as an unnecessary risk. All rabid animals and suspect rabid animals are killed at the earliest possible moment. It is worth noting that rabid animals seem particularly resistant to the sedative (xylazine) usually used to

render them unconscious. Much larger doses of xylazine need to be given to produce a safe level of sedation. The reason for this is unknown, but may be due to some action of the virus on opiate receptors.

### **Rabies Diagnosis in Living Dogs**

From:

Six Criteria for Rabies Diagnosis in Living Dogs

V.Tepsumethanon, H.Wilde, F.X.Meslin. Journal of the Medical Association of Thailand Vol **88** (3) 2005 419-422

These workers developed six clinical criteria upon which to judge if a living dog had rabies. These criteria were found to have over 90% sensitivity, 96% specificity; and 94% accuracy when compared to FAT and other diagnostic tests conducted post-mortem.

The proposed system involves a clinical decision tree;

1. Age of Dog?
  - a) Less than one month old.....Not Rabid
  - b) More than one month or unknown.....Go to Step 2
  
2. State of Health of Dog?
  - a) Not Sick or sick more than 10 days.....Not Rabid
  - b) Sick less than 10 days or not known.....Go to Step 3
  
3. How did illness evolve?
  - a) Acute onset from normal health.....Not Rabid
  - b) Gradual onset or not known.....Go to Step 4
  
4. Change in condition in last 3-5 days
  - a) Stable or improving with no treatment.....Not Rabid
  - b) Clinical signs progressing or not known.....Go to Step 5
  
5. Is the dog 'circling'?  
(walks in a circle and hits head against walls as if blind)
  - a) Yes.....Not Rabid
  - b) No or not known.....Go to Step 6

6. Does the dog show at least 2 of the following clinical signs?
- a) Yes.....RABIES
- b) No or only one sign.....Not Rabid
- Drooping jaw
  - Abnormal barking sound
  - Dry drooping tongue
  - Licking its own urine
  - Abnormal licking of water
  - Regurgitation
  - Altered behaviour
  - Biting/eating abnormal objects
  - Aggression
  - Biting without provocation
  - Running without apparent reason
  - Stiffness of gait
  - Imbalance of gait
  - Restlessness
  - Sleepy appearance
  - Frequently 'dog sitting'

#### **4. Counting Methods**

Although some of the monitoring of the Help in Suffering ABC programme can be argued to be unnecessary for a programme not involved in dog population studies, some means of measuring the work of an ABC programme needs to be established.

There are good reasons to attempt some counts of the population that is the subject of the programme. The civic authorities may need periodic proof that ABC methods are achieving what they have claimed they will achieve; and the managers of a programme may also need to show funding bodies of the effectiveness of the programme. Population surveys also serve to indicate if the ABC programme is operating at the right intensity or rate. (It is our belief, though we have no evidence to prove this, that a certain rate of throughput, in dogs sterilised/vaccinated per month, is necessary to achieve success).

A number of methods have been outlined to measure the population of dogs in the WHO/WSPA Guidelines for the Control of Stray Dogs. The subject is complicated involving as it does both population biology and statistical significance. The method used at Help in Suffering is a direct count method using a set route through given areas covered by our programme. Our method is undoubtedly not the best, nor is it one recommended by population biologists to whom we have spoken. However having commenced data collection with one method changing methods may invalidate the data previously collected, consequently we continue to count in our way.

New ABC programmes would be well advised to consult a population biologist, statistician and the Guidelines before embarking on a series of counts to determine a programme's effectiveness. Amongst the matters for consideration is the need for as little 'noise' in the counts as possible. We achieve this by standardising staff, route, time of day, time of year of counts. Initially it may be difficult to determine all the factors that may effect the dog population counted rather than the factors determining the actual population. For example breeding season may limit the sightings of bitches with pups; climactic extremes may cause dogs to move into, or out of cover. Before starting counting some effort to determine these, and similar variables, and thus eliminate them from the counting methods, should be attempted.

## 5. ABC Kennels: Dimensions and Design Considerations

At HIS a number of different kennel designs have been tried over the years as lessons have been learnt. When building kennels it is important not to underestimate the destructiveness of street dogs when kennelled and their determination to, and skill at escape. The design at HIS has constantly evolved as experience has been gained and incidents reveal further weak points in the existing design.

The dimensions of the 2 designs of kennel that we consider best are given below.

### 'A' Kennel block (outside)

Width: 4ft 10 in.  
Depth 5ft  
Height 7ft 6in.

Doors 3ft wide (total aperture)

Platforms depth (front to back) 2 ft.  
height (above floor) 1 ft 5 in. (but would be better at 4 inches)

### 'N' Kennel block

Width: 3 ft 6in  
Depth: 4 ft 6 in  
Height:7ft 6 in

Doors 2 ft 5in. (total aperture)

Platforms depth (front to back) 1ft 9 in.  
height (above floor) 4 in

### Fencing of Enclosure:

Fencing generally: 6 ft 10 in. high

Fencing at unloading area, and between shelter and street:  
8 ft 3 in (with last foot as inward facing overhang)

### Doors

No gap should exceed 2 inches to prevent pups escaping. This includes gaps between doors and door frame or floor. Two inches is measured from the edge of one bar to the adjacent edge of the next bar, i.e. does not include the thickness of the steel of the bar.

### General design features.

Wood is probably an unsuitable material to have in any kennel design for street dogs as they will chew and destroy it. Iron if used in construction should be well primed and painted to prevent rust.

Kennels are constructed of rendered (cement plaster) brick which is painted. The floors are of polished concrete. Each kennel should have a separate drain (covered with jhali) leading to a main effluent drain. Drains should be kept straight and have well designed chambers with access from surface at frequent points to allow cleaning. PVC pipes of at least 4 inches diameter may be better than ceramic pipes. If solid matter is to enter the pipes the problems associated with blockages should be considered bearing in mind such factors as the fall on the pipe and the expected water flow through it. At HIS we endeavour to keep solid matter from entering the drainage system because of blockages.

Outside of kennels a walkway of concrete is needed preferably draining away from the kennel.

Depending on situation kennels should have adequate verandah to shade the kennel from the sun.

Rear windows (barred as for doors with an inter-bar space of 2 inches) improve ventilation and light. If possible such windows should have bars so positioned that there is no window ledge within the kennel. Again depending on location windows may need verandahs/overhangs to prevent sun or rain entering the kennel. If rear windows are not possible then air vents should be incorporated to allow some through flow of air.

Doors (and windows, fences etc) are made of iron welded rods and bars. Doors should open both inwards and outwards as this enables easier kennelling of dogs and easier checking of dogs post-op.. Doorways should be of adequate height to allow easy access and exit to personnel. Doors and windows should have vertical bars only otherwise dogs may climb them to escape. Doors are secured by bolts. We have found it useful to have metal bolt hole plates on the door jamb to prevent bolt holes becoming enlarged as dogs attack the doors. The hole in the bolt hole plate should not be circular in shape but of an elongated shape running vertically which provides tolerance in the event the door drops on it hinges over time. Gates from kennel areas to outside only open into the kennel enclosure and have been fitted with spring closing mechanisms to limit the possibility of dogs forcing the gate, or of them being left open inadvertently. Bolts securing outside gates have chains so that the bolt may be secured in the closed position to prevent dogs from moving the bolt. At HIS we do not use angle iron for the door frames, but rely on masonry pillars, which is why bolt hole plates are needed. If angle iron is used the doors can open one way only.

Walls and surrounding fences should be designed to make climbing difficult (no horizontal ledges, and only vertical bars)

Adequate provision for water sources should be incorporated into the design of a kennel block. Cleaning water and drinking water is required. During construction of kennels thought should be given to rain water harvesting systems and to water conservation from drains/washing water. Taps in kennel yards to which dogs have access are prone to damage by dogs. The dogs may also use protruding taps and pipes as a means of climbing a fence or wall

Sub-dividing kennel blocks and their outside areas allows for better enclosure of dogs, and helps stop having to chase dogs round and round when they are loose.

An unloading/loading area is needed. The design of this will depend on the design of vehicle used for catching and releasing dogs. That at HIS allows the vehicle to reverse until it touches the area fence so escape of dogs is not possible.

Adequate artificial lighting should be incorporated to allow movement of dogs at night, or veterinary attention if necessary. Again the use of light for climbing by street dogs should be considered. Electrical supplies need to be protected from chewing by street dogs.

Kennels should if possible face away from nearby dwelling houses due to the noise dogs may make. We are currently investigating kennel designs which may limit the noise produced by dogs.

Having a yard (outside area) in which dogs can run loose but secure is useful if space permits.

## 6. Same Day Release – should it be considered?

### Personal thoughts by Ray Butcher (Veterinary Advisor to WSPA)

January 2006

This statement is my personal view as a veterinarian and was prompted by a request from Christine Townend of *Help in Suffering*, Jaipur, India. I accept other veterinarians may have different views.

Preamble

When a veterinary surgeon qualifies in the UK, he/she makes a declaration that states:

“.....I promise above all.....that my constant endeavour will be to ensure the welfare of the animals committed to my care.”

Thus I strongly believe that if we perform some surgical procedure on an animal we are responsible for ensuring care is provided until the animal is fully recovered. The only way we can do this is to monitor the case throughout recovery (or ensure some other competent person does so).

When discussing Trap/Neuter/Release (ABC) programmes, I have frequently expressed my concern that the “conveyer belt” system tends to encourage the view that the best surgeon is the one who performs the most operations per day or in the shortest time, or even via the smallest incision. It is my view that the best surgeon is the one whose patients recover the quickest and with the least number of complications. Indeed in many traditional TNR programmes, the limiting factor to performing more operations over a one-month period is often the amount of available kennel space – improving recovery rates allows earlier release and hence may in turn allow greater throughput.

Aseptic techniques

It is a basic fact that almost all post operative infection results from contamination of the wound at the time of surgery. Aseptic technique is not therefore something that is just for textbooks – we must all aspire to the highest standards that are practical. The reality is that for practical or financial reasons some compromises may have to be made. These may not make a significant difference to the end result, but all *may* increase the potential risk of infection and multiple compromises clearly increase the risk to a greater extent.

So any surgical unit (including TNR / ABC programmes) must have a protocol in place to assess the postoperative recovery of their patients- the trendy “*buzz word*” for this is a *Clinical Audit*. If the results are very poor, we should seriously consider stopping all surgery – there are basic minimum standards that must be in place if surgery is to be performed at all. If the results are at the low end of average, we should look carefully at our aseptic protocols and identify problem areas that can be improved. If our results are good, then we can provide proof that our methods are acceptable – i.e. our clinical decisions are *Evidence Based*. For a surgeon to claim

good results without the means of postoperative monitoring is in my opinion somewhat arrogant.

Even if results are good, we should always strive for better. The introduction of new techniques may be assessed qualitatively if some standardised method of checking and reporting the state of the wound is used.

A further complication is that the results are dependent on the actions of the whole team. Giving one vet a month of training in a good facility does not ensure that the standards will be equally as high when he returns to a different facility with a different team. Each team must monitor its own cases.

### Postoperative monitoring

In our private clinic, neutered animals are returned to their owners the same afternoon. The owners are given instructions about signs that should concern them and they know the clinic is open 24hours / 7 days a week if there is a problem. We routinely check the wounds in 7 – 10 days after the operation.

In most TNR / ABC programmes in India, it is normal to keep the animal hospitalised for a period of 3 – 10 days until it is considered fit for release. For many reasons, the quicker it is possible to release the dogs the better. This system does allow a means of assessing results, though standardisation of the reporting system would be a benefit.

Suggesting a minimum number of days that the dog should stay may at first sight appear a useful guideline. However the optimum length of stay is a reflection of aseptic technique and surgical standards – thus the release day should reflect how the dog and the wound looks not simply an arbitrary number of days.

*Same day release is an attractive option because it avoids the cost of kennelling and allows a greater throughput of animals. If surgical standards were high, there may well be little problem – but what is the evidence of this in each case? Even the best surgical team in the best facility will experience some problems! I believe for ethical and moral reasons, it is essential that some monitoring system be in place. This could take the form of:*

- 1. Dogs being released into the care of owners or “carers” in the community, which will take on the responsibility of aftercare. In such circumstances, the surgical team should provide such carers with some basic education and be available in case of problems.*
- 2. Members of the team should be delegated to check all the dogs in the release zone on a daily basis and record progress. This might be a logistical and practical problem.*

To introduce a *same day release* programme without the provision for such monitoring is in my view unethical. Worse are cases where a mobile unit performing such a programme moves on to a different area and so is not available for back-up. Such scenarios may in fact result in animal welfare problems caused as a direct result of the surgery that go un-noticed, and yet the surgeons claim great success without evidence.

**HELP IN SUFFERING**  
 MAHARANI FARM, DURGAPURA, JAIPUR

**ABC KENNEL CHECK LIST**

Kennel No.	ID No.	1/1/06	2/1/06	3/1/06	4/1/06	5/1/06	6/1/06
A 1							
A 2							
A 3							
A 4							
A 5							
A 6							
A 7							
A 8							
A 9							
A 10							
B 1							
B 2							
B 3							
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B 6							
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B 9							
B 10							
C 1							
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C 6							
C 7							
C 8							
C 9							
C 10							
D 1							
D 2							
D 3							
D 4							
D 5							
D 6							
D 7							
D 8							
D 9							
D 10							







HIS ABC Summary Data

ITEM	TOTAL	1994 began in October	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>Dogs received from-</b>														
<b>Municipality</b>	<b>4034</b>	0	0	476	1108	1079	609	579	139	44	0	0	0	0
<b>HIS staff</b>	<b>34194</b>	250	1409	2352	1450	1991	2710	3530	3488	3772	3765	4215	4919	9411
<b>Total received</b>	<b>38228</b>	250	1409	2828	2558	3070	3319	4109	3627	3816	3765	4215	4919	9411
<b>Total vaccinated against rabies</b>	<b>34582</b>	223	1202	2394	2280	2723	2941	3780	3377	3522	3503	3963	4676	8890
<b>Total spayed</b>	<b>23406</b>	223	1169	2183	1559	1910	2441	2414	2221	2325	2368	2178	2416	2557
<b>Total castrated</b>	<b>5216</b>	0	0	2	0	16	10	875	977	794	851	848	843	936
<b>Total Vasectomies</b>	<b>10</b>	0	0	0	0	0	0	10	0	0	0	0	0	0
<b>Total operations</b>	<b>28632</b>	223	1169	2185	1559	1926	2451	3299	3198	3119	3219	3026	3259	3493