

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 which Help in Suffering Animal Shelter has accumulated over the past eight 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 three principles to which we adhered; 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.

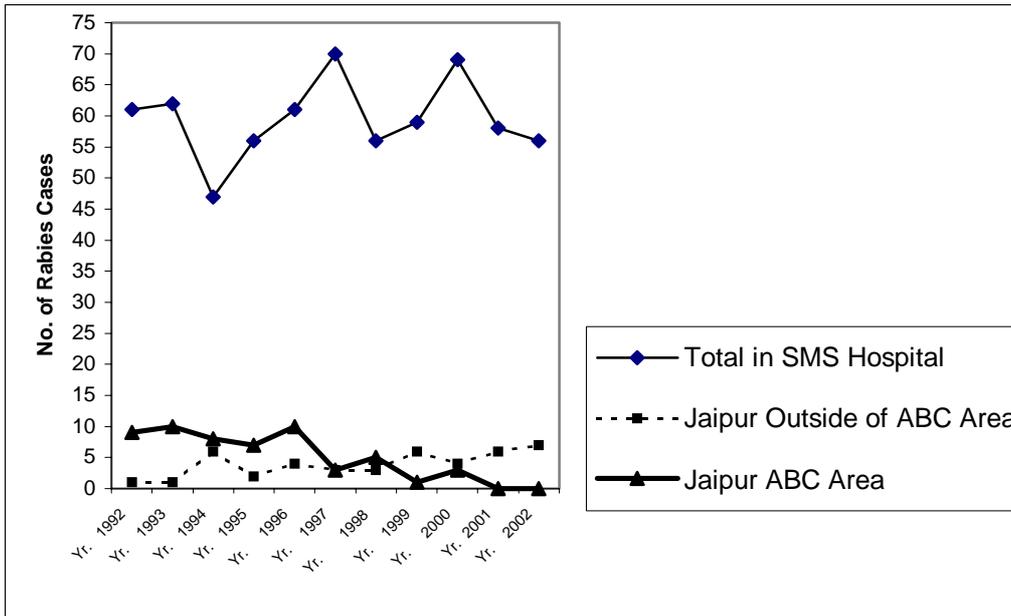
Initially our programme began as a trial in three discreet areas. We decided to do it in this way because we wanted to ensure that our protocol for handling dogs humanely was fully evolved before we expanded the number of dogs passing through the programme. The trial proved successful and we moved on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

Now, eight years later we are able to establish from our statistics that an ABC programme can work 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 293 dogs per month.)

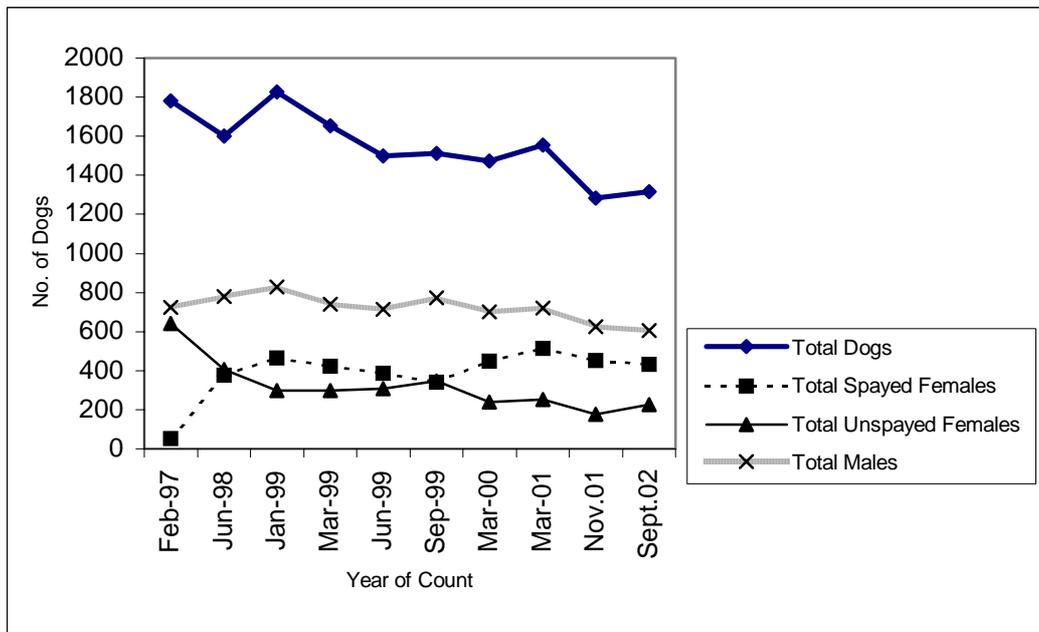
There have been no cases of human Rabies in Jaipur for the last two years despite the fact that previously there was a high incidence of cases (see graph below). Additionally our figures have shown that the dog population has actually reduced by about 28% (see graph below).

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
Managing Trustee, 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 approx. 2 million (2001). 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.

WHO report that every year between 20,000 & 30,000 Indians die of rabies, and India 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 World Health Organisation (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 a systematic sterilisation programme rather than the mass euthanasia programme undertaken by the municipality. 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 and proposed that the 'ABC' methods should be scientifically tested by a pilot programme conducted in a discreet area 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 was 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 will be noticeable nonetheless. For instance there is a rapid decline in the number of unsupervised dogs which 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 the Tees Hazari Court in New Delhi found that street dogs should not be killed in Delhi, as a result of a case brought against the Municipal Corporation of Delhi by Smt. Maneka Gandhi. The Animal Welfare Board of India (AWBI) has 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, Delhi, Calcutta, Madras, Bangalore and Hyderabad. The AWBI set out guidelines for the programmes. The Jaipur programme began in November 1994.

The HIS/ABC Programme

In October 1993 WSPA representatives visited HIS and proposed that the Help in Suffering (HIS) shelter 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, more healthy, friendly and rabies free street dog population.

Although there has 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. From comments made by other animal protection groups we also suspect that there is money changing hands, and that the skins can be sold, as can live animals for vivisection.

Why Bitches ? Why Not Male Dogs ?

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

One unspayed female 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 6 pups only). One unneutered male could mate with several females resulting in hundreds of unwanted births. 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 more effectively protect 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 a bureaucracy whose officials were frequently changing, 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, Chair 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. The Municipal Corporation of Delhi has created a new ABC Society as an NGO body. This new NGO has representatives of the Delhi Health Deptment and other local bodies. MCD has also asked councilors and the chambers of commerce to contribute.

Unfortunately such a coordinated 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).

The tendency by 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 over-all reputation of ABC programmes in 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 of 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. The overall, ultimate answer to street dog population control is to control the availability of edible wastes.

In many parts of the world, a large proportion of dogs receive 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 which 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 assume occasional responsibility for these dogs, when it comes to protecting them from dog catchers or bringing them to an rabies vaccination clinic.

Rabies

The high density of 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 half occur in India.

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 coloured '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 (see note below).
- 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 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 both 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 colour was loosely rivetted 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 which 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 fill 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 which 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 from where it intends to run a programme in conjunction with that at HIS. All municipality complaint dogs are now taken to this facility.

During the course of the programme a number of males and female dogs are brought to the shelter which are terminally ill, badly injured or too aggressive to be enrolled in the programme so in these cases the animals are euthanased humanely. At present approximately 10% of all the dogs brought to the shelter fall into this category.

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. The latter is performed to fulfill one of the reasons for the establishment of the ABC programme at HIS, a better understanding of the population of street dogs should allow better methods of control.

Monitoring of the programme as it effects individual dogs is essential to ensure that the programme's direct interference with the individual dog's well being is entirely beneficial. This is done through a clinical audit of the following:

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 (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 has been 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 who 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 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 which 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.

b. Migration Data

For a number of reasons marked (ear notched) 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 of the dog.

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 block. 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. 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.

Counts are done twice a year in spring and autumn when the Jaipur climate is relatively benign.

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 an estimate of the total population is of very limited scientific use, although may be a figure required for publicity and promotional purposes, as it is the trends within the population which are of greater interest.

d. Rabies Monitoring

Rabies incidence data is notoriously subject to many inaccuracies.

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.

At the time of writing an attempt is being made at using 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

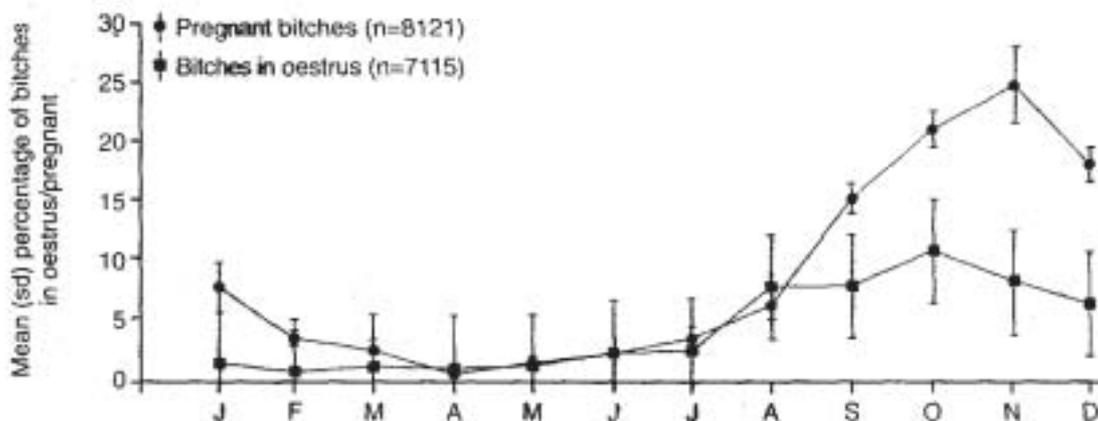
The results of the monitoring of individual dogs done as described above for the ABC programme on a daily basis are not relevant to this discussion. Suffice it to say that such monitoring allows for identification of problems or improvements in the clinical performance of the programme and for these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

For the whole ABC area a total of approximately 23,000 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

Migration Data

In total 92 bitches were included in the sample of ABC animals recaptured for various reasons. The average distance travelled by the dogs was 2.9 kms and the average time between sampling was 565 days.

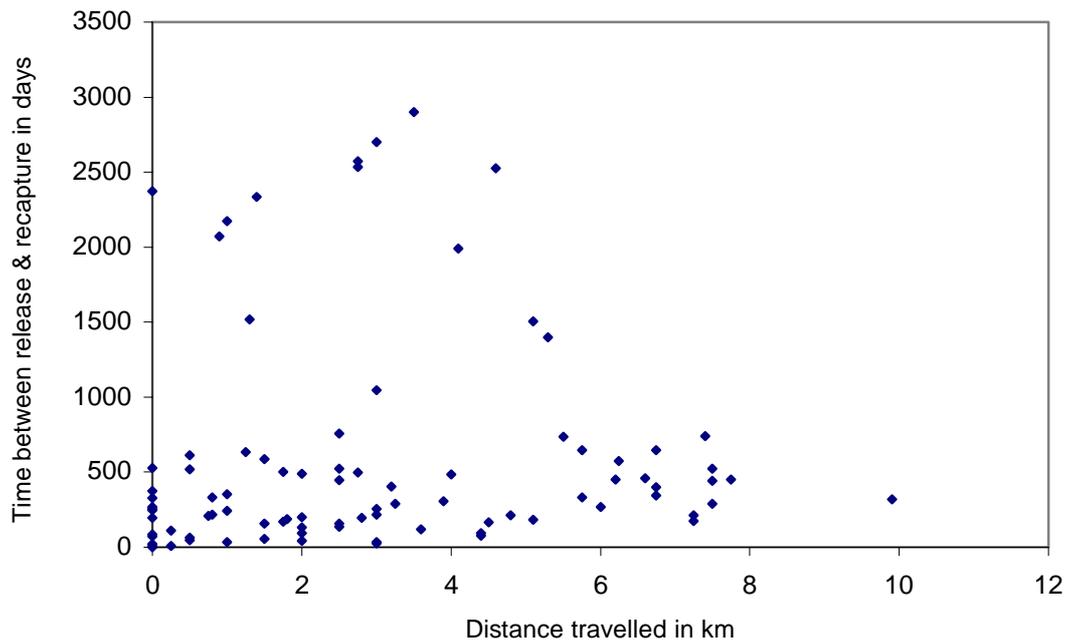
The largest distance recorded as being travelled by an individual was 9.9 kms; the shortest distance is zero km.

The longest time between release and re-sampling was 2,902 days. The shortest time period was 1 day.

21.7% of dogs travelled 0.5 km or less.

15.2% of dogs had survived for a 1,000 days or more after release.

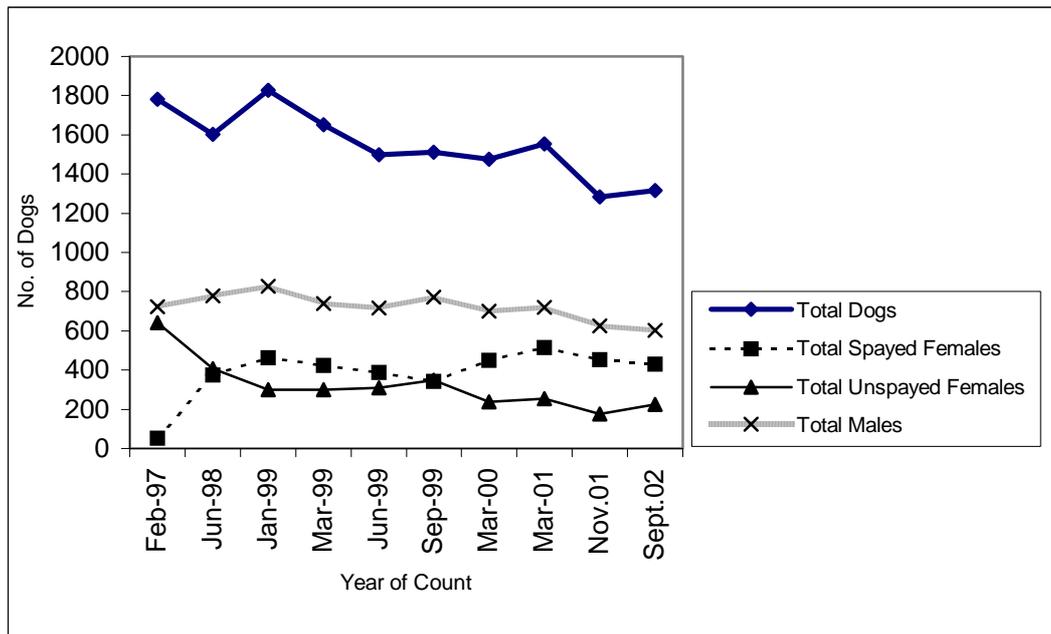
This data, when further analysed may enable the survival time or longevity of street dogs to be assessed. This has important implications for ABC programmes particularly with respect to revaccination policies adopted.



Graph 4. Scatter plot of Migration Distances and Times

Population Surveys

Although not without inaccuracies there are clear downward trends in the size of the street dog population counted. After 6 years of conducting the programme in the study area the population of street dogs has declined by 28%. The proportion of female dogs sterilised and vaccinated against Rabies has, in this time, risen to 68% of the total female population.



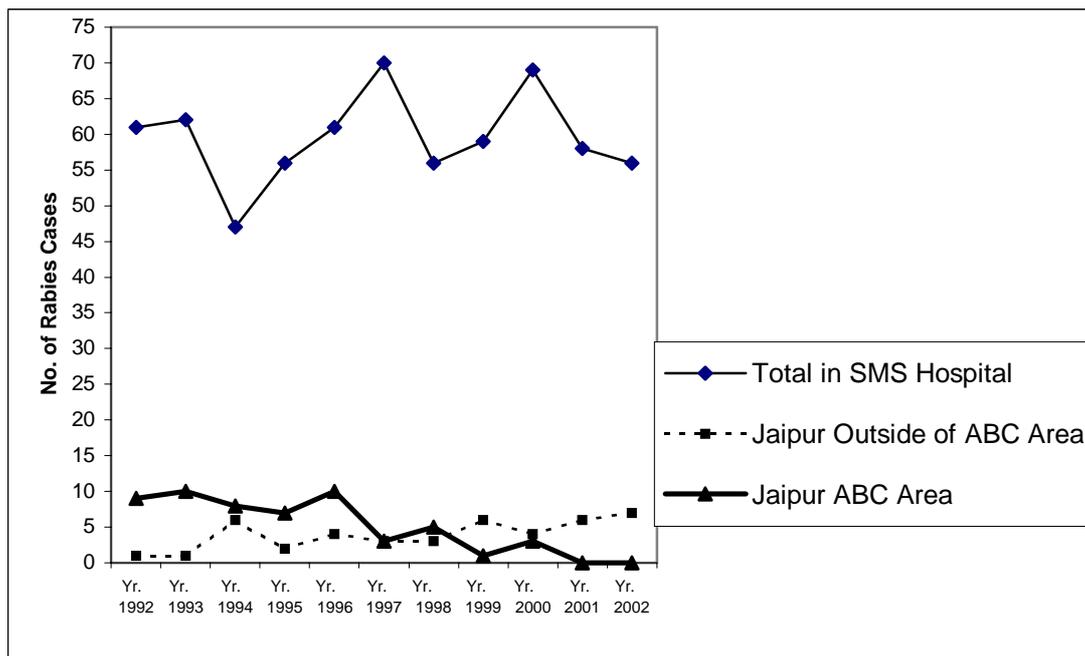
Graph 5. The Decline in Street Dog Population since the start of the ABC Programme

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 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.

These are being undertaken at the time of writing. 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.

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VETERINARY GUIDELINES FOR ABC PROGRAMMES

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

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CATCHING

In Rabies endemic areas it is imperative that ALL staff are fully vaccinated against rabies before they begin work with street dogs.

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.

Methods used

1. By hand - friendly dogs can be caught this way. The dog is held firmly by the scruff (loose skin on the neck) with one hand and lifted with the other hand under the body. 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 by hand in this manner requires some physical strength and knowledge.

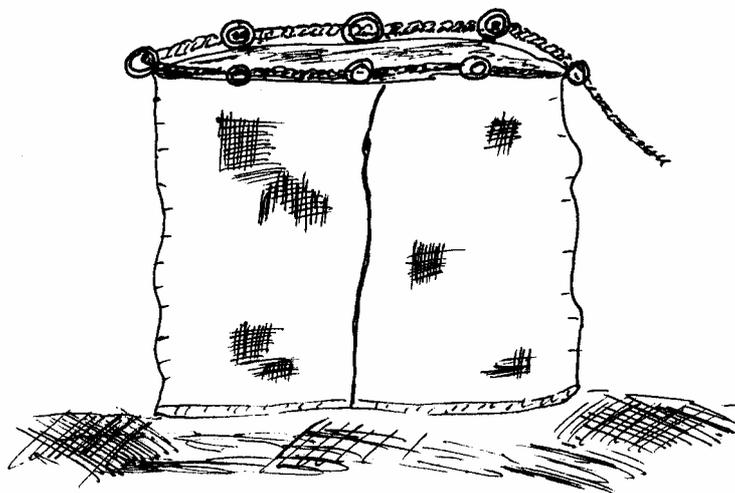
2. Using 'sack and loop' method.

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 who 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 no 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 is that sack catching is an appropriate technology for developing countries whereas western made catching equipment is very expensive, and local made versions of western catching equipment are less refined than the original, and are more expensive to make than a catching sack as described above. It is worth noting that some animal welfare organisations do not agree with the professional veterinary opinion laid out above. As yet these organisations have been unable to produce any professional or scientific argument to support their contrary view.

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.

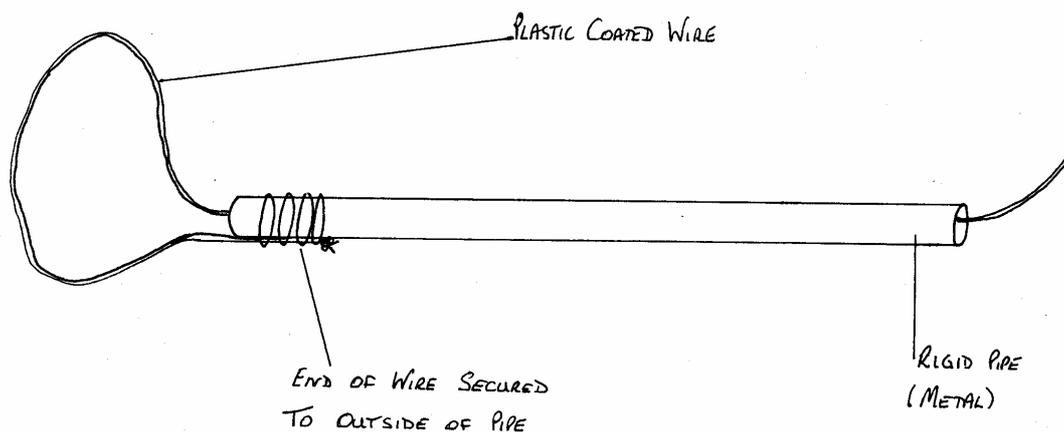


Sketch of Catching Sack

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 animal becomes very suspicious of the smell. Efficient catching requires that the catching sacks are kept in good order and replaced or repaired regularly.

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



Sketch of 'Homemade' 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 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 blow pipe 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 three months of age 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 suggest 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 to avoid 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. 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 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 which 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.

Kennelling

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. Around once a week they are 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.

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

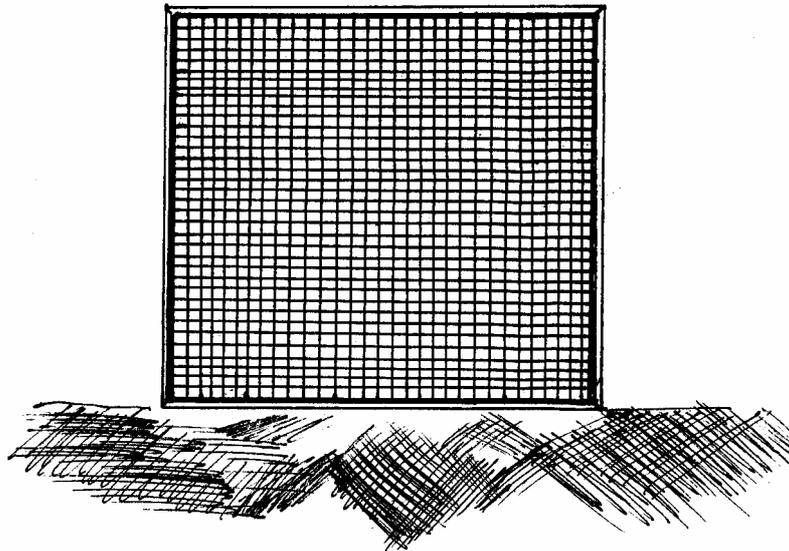
Unloading

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)

Each dog has its own kennel.



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 femoral nerve which runs lateral 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. Injectable anaesthesia is used. 2.5% thiopentone sodium solution is administered I.V. through a catheter / scalp vein set. An initial dose of 10 mg / kg is given. This equates to 4ml per 10kg bodyweight. The bandage muzzle is removed, the dog's mouth opened so that the tongue drops to one side and will not block the airway. It is important to wait 30 seconds between each incremental dose to allow the full effect of each increment to be observed and avoid over-dosing. We find that following triflupromazine pre-med. the average 15kg non-pregnant bitch requires a total of 20-25 mg / kg bodyweight of anaesthesia to perform a spay of 15-20 minutes duration. Formerly a 5% thiopentone solution was used. This is much less satisfactory as dosing is less accurate resulting in prolonged anaesthetics. 5% thiopentone is also very irritant if accidentally introduced peri-vascularly.

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.

Young dogs and small dogs are anaesthetised using a xylazine/ ketamine combination following pre-medication with triflupromazine.

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 young or small dogs. The mixture can be used in adults, and the only reason for it not being used on all animals is the cost of the mixture needed for larger animals. 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.

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.

Notes on the various anaesthetic regimes used at Help in Suffering are in the appendices.

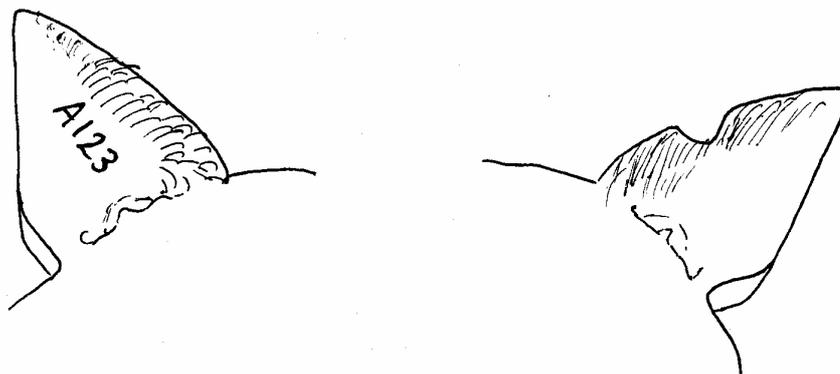
Once anaesthetised the following procedures are performed in the preparation room prior to surgery.

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.



4. An individual identification tattoo is placed on inside of right ear.

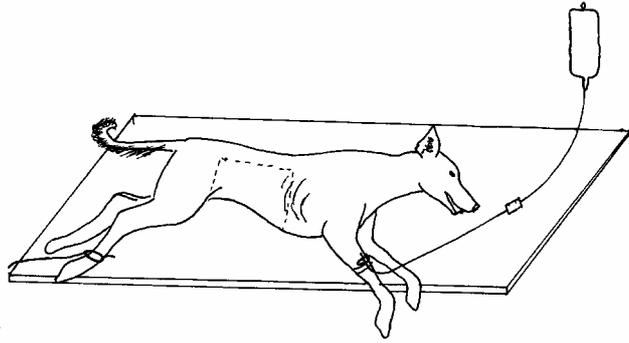
5. I.M. injection of long acting amoxicillin or penicillin of approximately 48 hours duration. Dose of 300 mg per dog is given.

6. I.M. injection of diclofenac sodium is given - 1mg / kg, for analgesia. This is a NSAID which is readily available and usually used in India. There is little literature on its effectiveness as a analgesic and anti-inflammatory in veterinary use, however it is the only injectable NSAID readily available at reasonable cost. 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 pain killers are better if administered before the onset of pain.

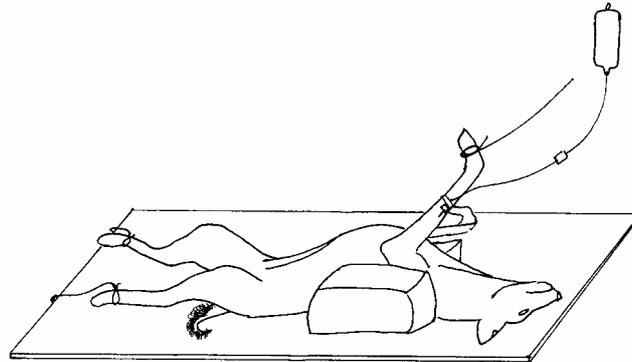
7. Rabies vaccination is given. A tissue culture vaccine is given. Recent evidence suggests that immunity to challenge persists longest if such vaccines are administered intra-muscularly. At HIS the quadriceps muscle mass is used in the hind leg. The lumber muscles are an alternative site. See notes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

Materials and items are placed in the best way to allow complete steam penetration: ie: drapes are folded individually and packs positioned vertically in direction of steam flow (top to bottom).

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 Sufering allows no exceptions to this rule under any circumstances. Finger nails 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.

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 deliterious 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 or her gloves using Betadine and surgical spirit (Betadine is used for the gloves rather than scrub them with chlorhexidine and tap water due to the dubious nature of the water supply).

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. Surgeons and surgical assistants wear surgical pyjamas but these are not sterilised. This 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.

SURGICAL PROCEDURES

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. This 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.

- 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 atrery 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;
- 1 Surgical cloth drape 32" x28" (80 x 70 cm) with window assymmetrically 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.
- 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

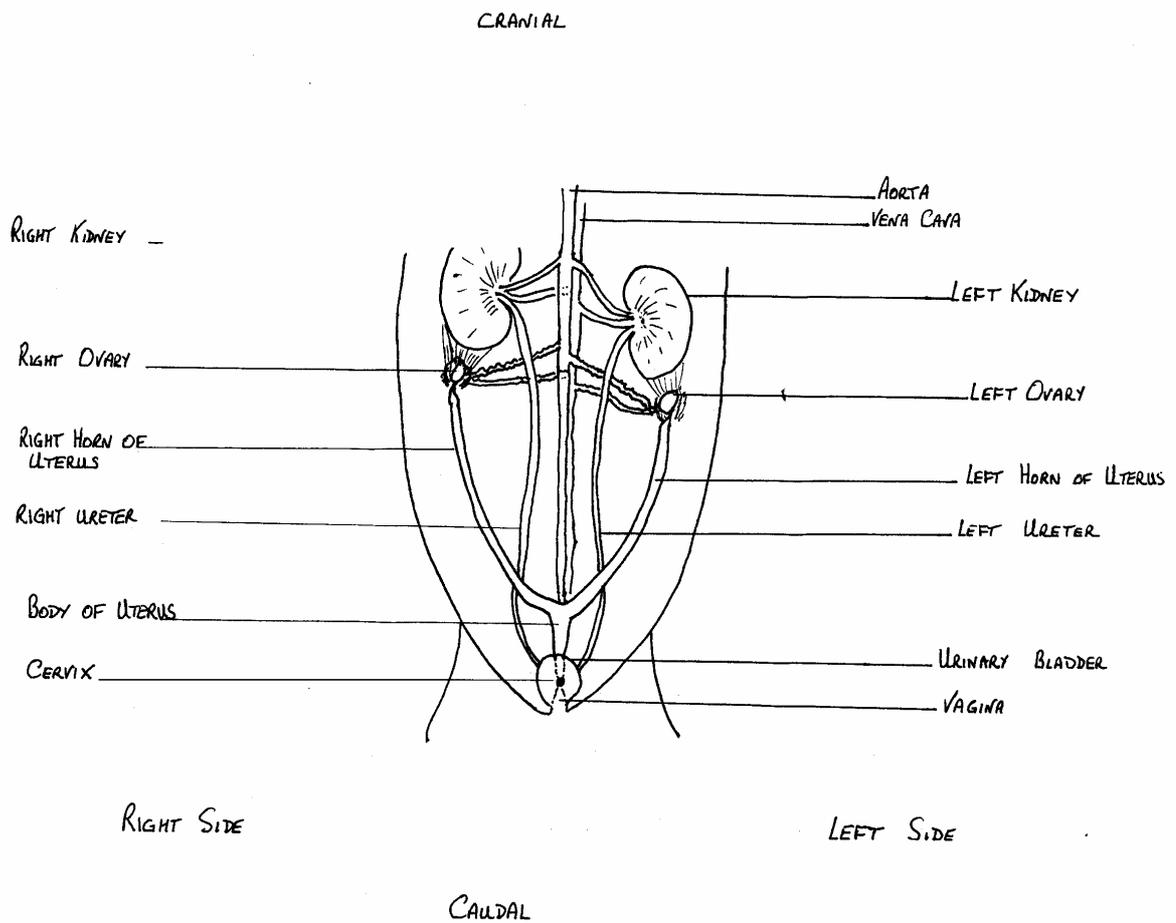


Diagram of Female Surgical Anatomy viewed from Ventral Aspect

We believe that the only logical and professional method of sterilising bitches is by complete ovariohysterectomy. Two common surgical approaches are possible to achieve this, 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 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 or dropped pedicles, can easily extend incision a little to locate and clamp 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.
2. Wound is more inaccessible and thus harder to check in fearful animals.
3. Risk of wound breakdown and herniation.
4. Dogs must be kept longer to allow adequate healing, as the healing rate of the fibrous linea alba is slower than muscle.
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:

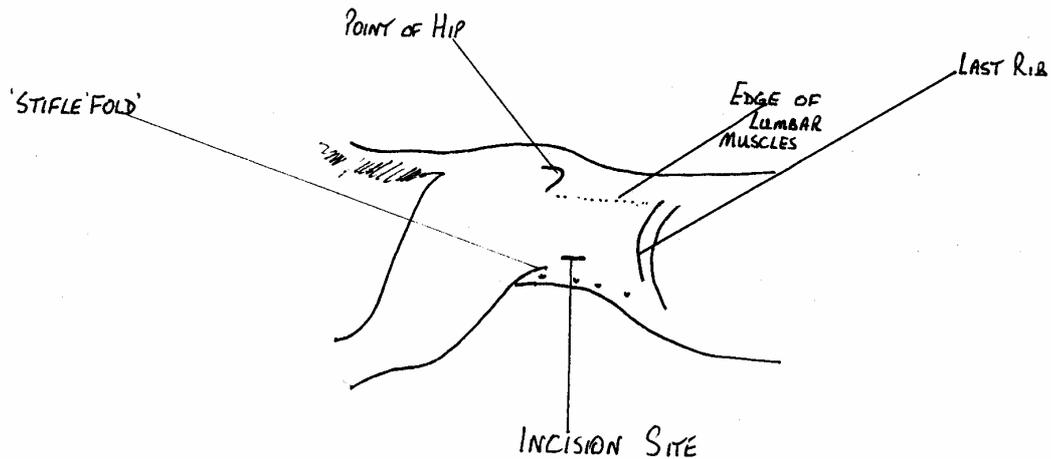
- 1) Heavily pregnant bitches (see earlier)
- 2) Pyometras
- 3) Fat and heavy, well-muscled bitches, such as pet dogs.

FLANK SPAY TECHNIQUE

Approach

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. 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 stifle fold of skin. 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 cervical stump.

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;
- External abdominal oblique muscle;
- Internal abdominal oblique muscle;
- Transverse abdominal muscle to which the peritoneum is often attached.

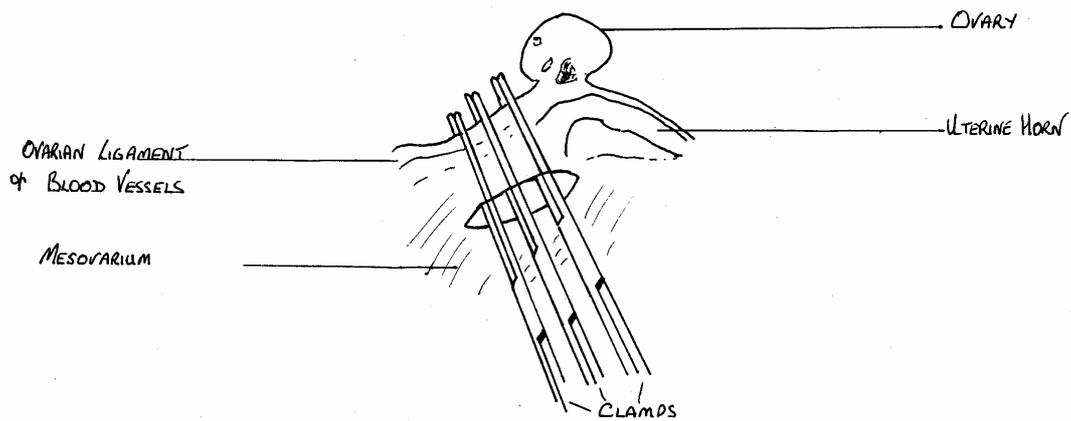
The skin is cut with a scalpel. Subsequent layers are separated using scissors and blunt dissection. Incising the 3 muscle layers can cause haemorrhage. Splitting the muscles along their fibres reduces bleeding, causes less trauma and faster healing, but may result in a smaller aperture through which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

Spay

The right uterine horn is located with spay hook. The horn is elevated so that the ovary is grasped between the thumb and index finger of one hand. The suspensory ligament is stretched or broken with the second finger of the 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.

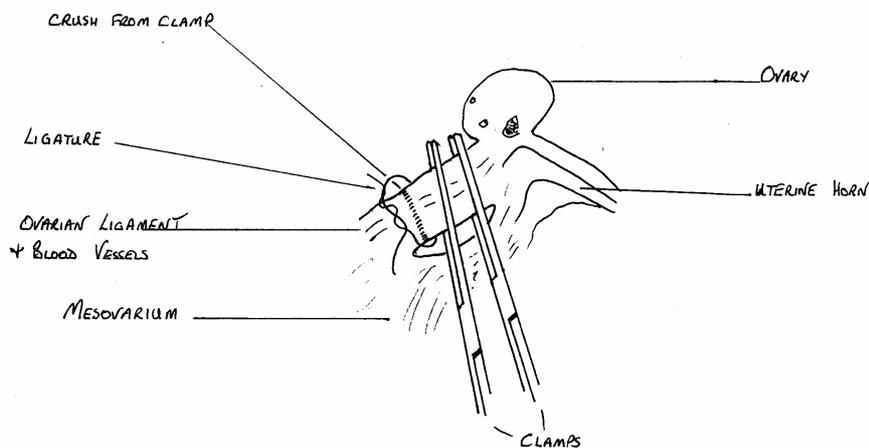
The ovarian vascular complex is clamped with artery forceps.



Clamping the Ovarian Blood Vessels

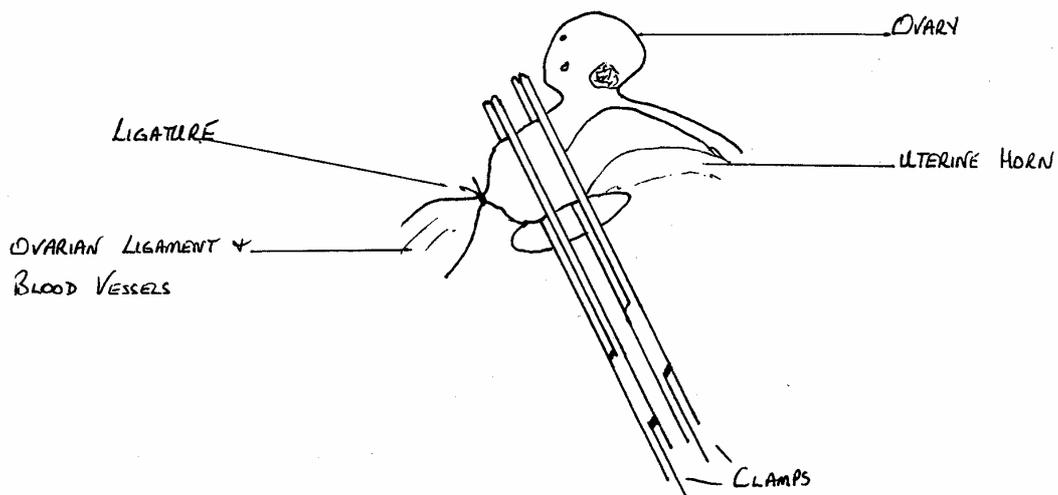
The surgeon should keep hold of the ovary when applying the first clamp to ensure the clamp is placed below the ovary and thus that entire ovary is removed.

An absorbable suture, eg. 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.



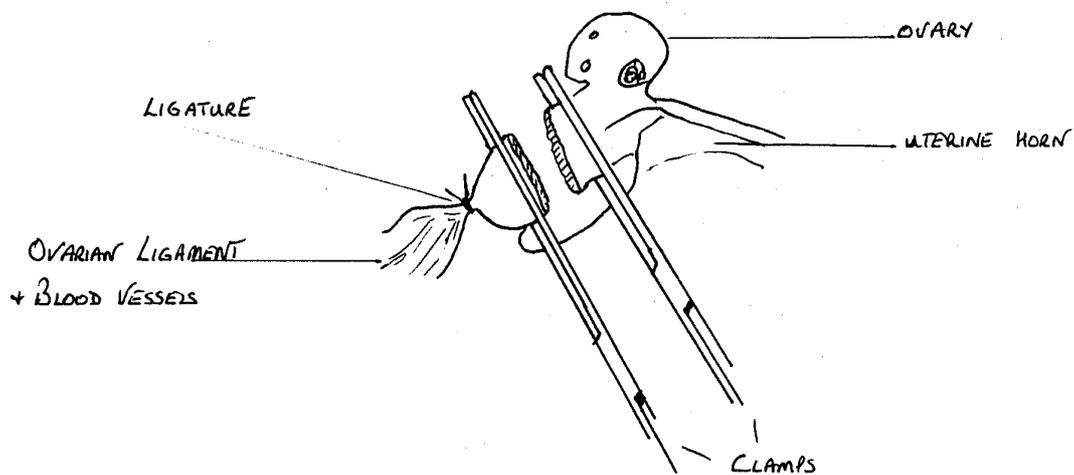
Placing Ligature into Crush caused by Clamp

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 ensuring that all ovarian tissue is excised.

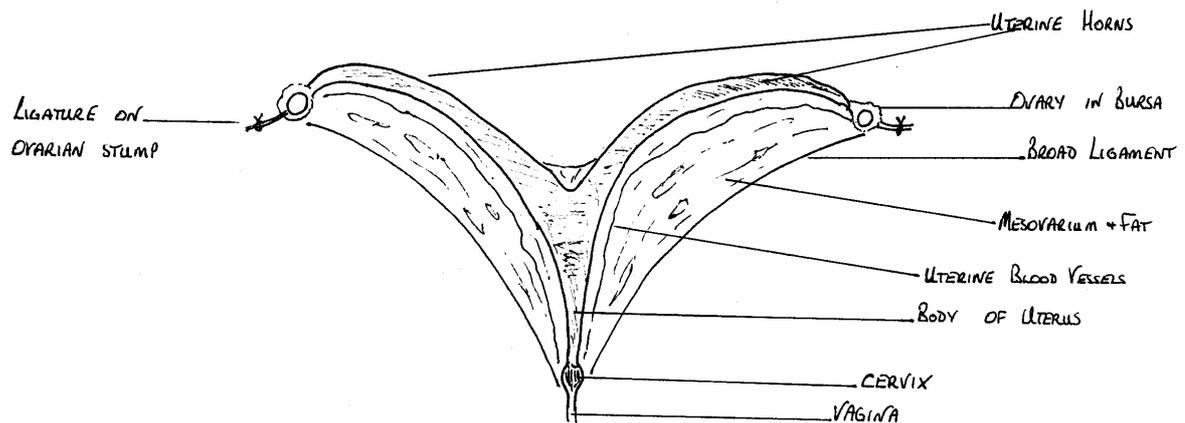


The Ovarian Vessels are cut from the Ovary

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.

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.

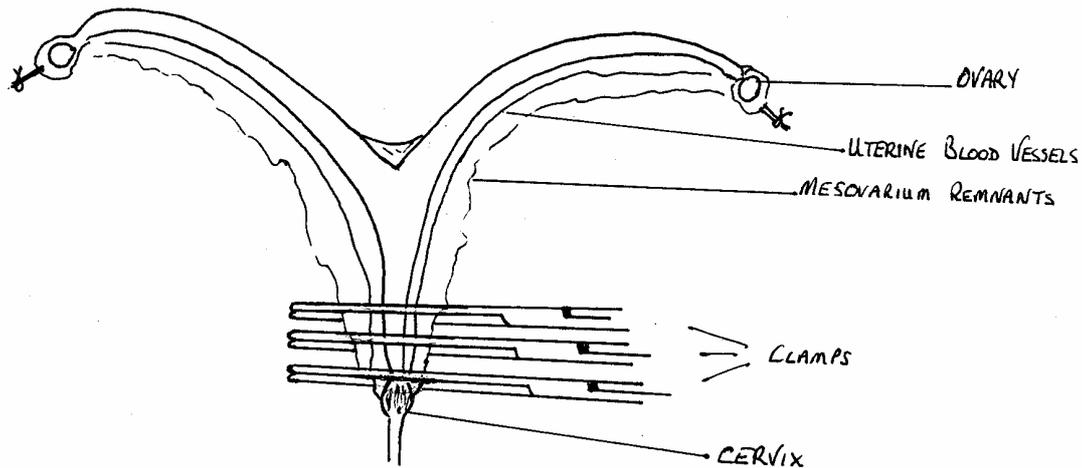


The Exteriorised Uterine Horns and Ovaries

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. Following this the uterus is seen separate from other tissues except from the vascular structures which run parallel to the uterus. The remnants of the mesovarium, broad ligament and associated fat are returned to the abdominal cavity.

The uterine body is exteriorised. The cervix is located. 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.

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 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 mesentry 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 suaged-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 knot which is drawn through the incision beneath the skin.

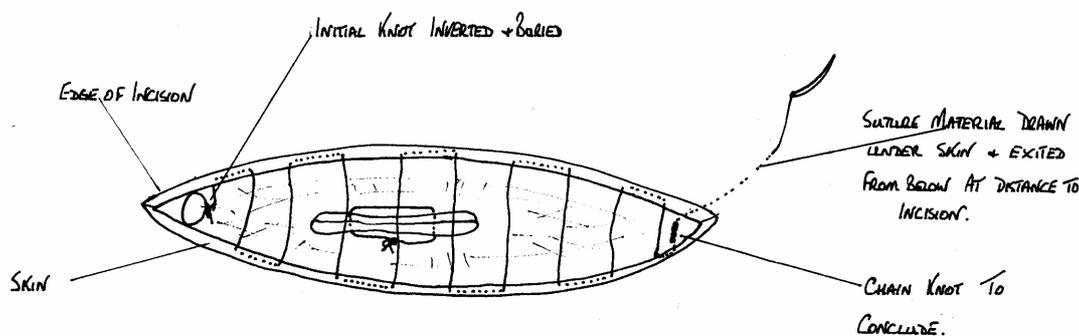


Diagram of intra-dermal suture

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.

Spay

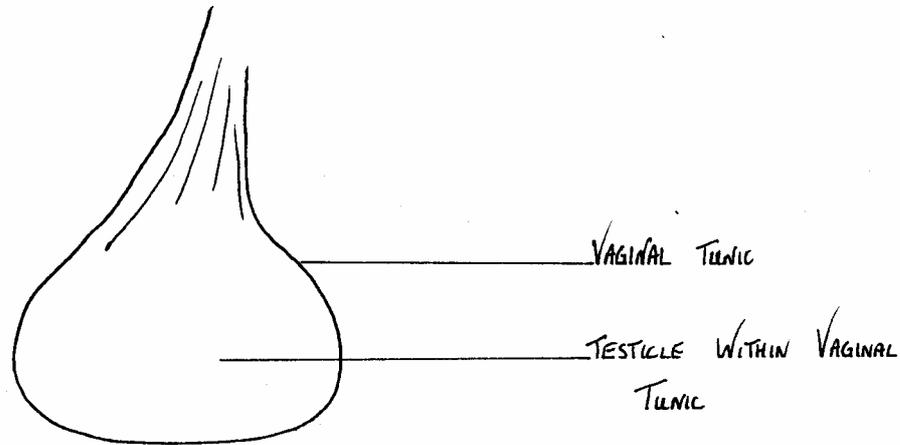
Routine spay is performed as described above for Flank Spay Technique.

Closure

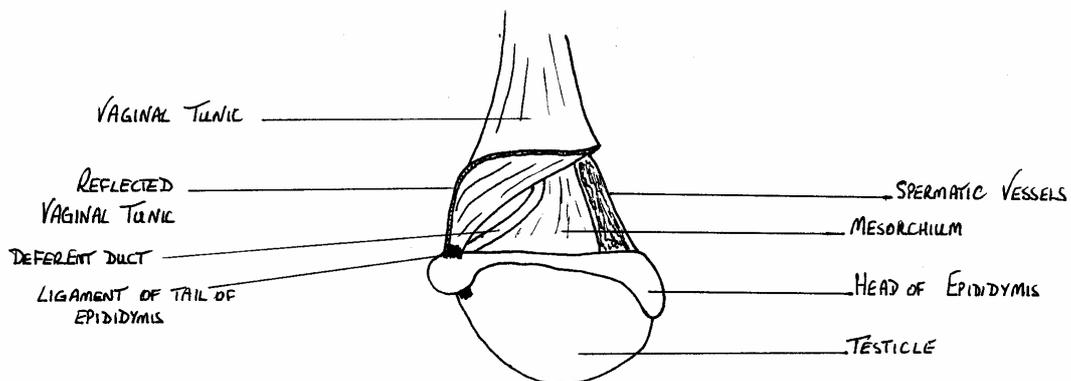
Abdominal closure is in 1 layer. A simple interrupted suture pattern is used in the linea alba. Sterile heavy gauge monofilament nylon is used. Subcutaneous tissue and skin are closed routinely as before.

CASTRATION

MALE SURGICAL ANATOMY



Testicle removed from Scrotum within Vaginal Tunic

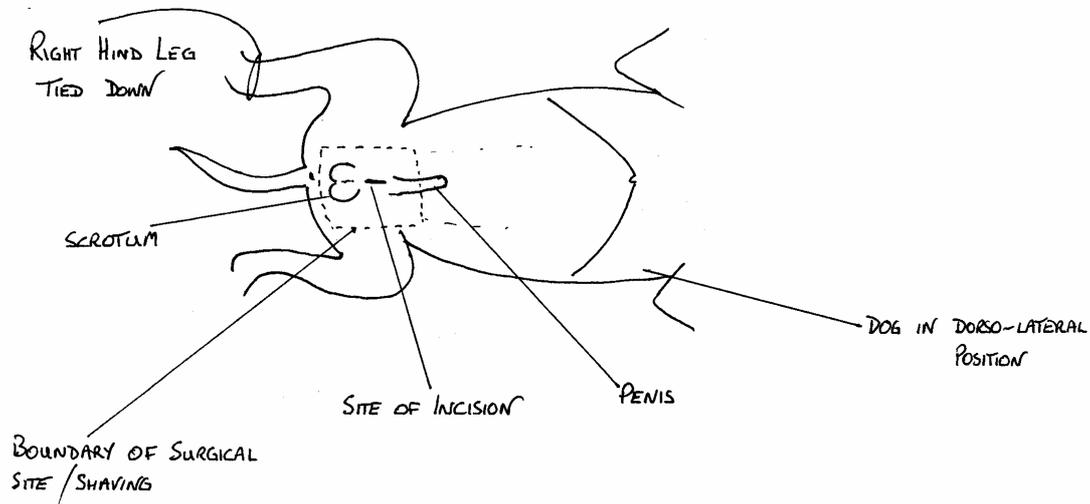


Testicle and Associated Structures after incision of Vaginal Tunic

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

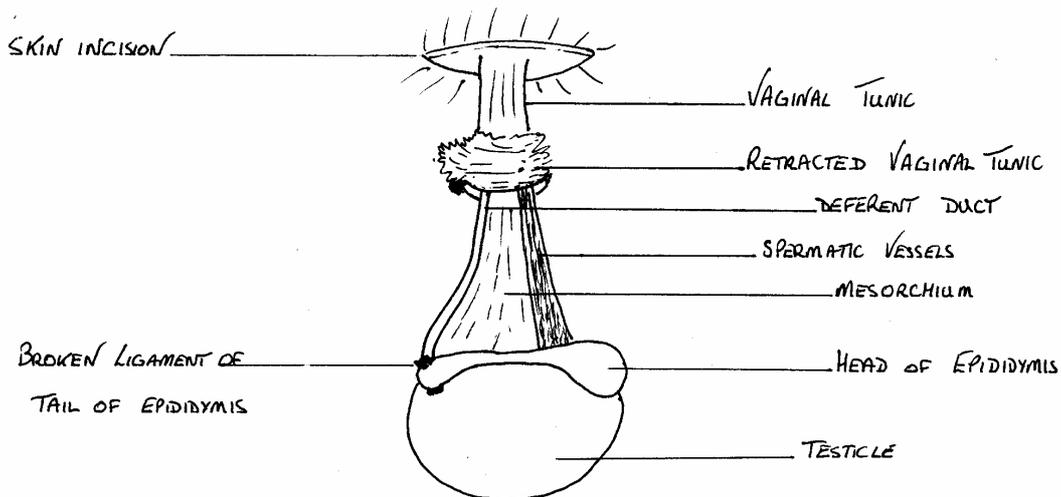
Males are positioned in dorso-lateral recumbancy facing to the right. The right hind leg is secured so that the pelvic region is exposed. The scrotal, penile, inguinal and perineal regions are shaved and prepared for surgery as described earlier.



Site of Incision for Castration.

Males are castrated through a single pre-scrotal incision. One testicle 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 sutures. Some surgeons attempt to place this suture through the vaginal tunics of the two testicles to ensure the potential opening into the abdominal cavity is closed. The skin is closed with a 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.

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 sufficient 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 is 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 but 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).

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 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 with 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.

ABC dogs are likely to be released before suture removal would be possible. For this reason an absorbable suture has to 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:

By tearing of ovarian vascular complex whilst stretching / breaking suspensory ligament. This can be avoided by stretching the suspensory ligament 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.

By tearing other large vessels in broad ligament while stripping this off the uterine body prior to clamping and ligation of the cervix. In the few cases of post-op 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, eg 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 in 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. This is one of the reasons why adult males are not included as part of the sterilisation programme.

2. Recurrent signs of oestrus / heat.

This results 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.

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 which 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 rivetted 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 check list 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.

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 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.

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.

The current, average releasing times from our programme are 3.79 days for females (including female pups) and 3.25 days for male dogs (mainly puppies). 16.02% of females and 5.16% of males stayed for 5 or more days after surgery. Only 1.15% 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.

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. If releasing is to occur in several areas dogs are marked by coloured paste (Holi powders) according to area. This is then noted on the releasing form which the team take with them. 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.

It is important to release the dogs in a quiet street and avoid busy main roads as the dogs are disorientated. 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 10 mile jeep ride and the public has been concerned that the released dogs were rabid. Feeding dogs immediately before they are to be released exacerbates this problem, and tends to cause considerable vomiting in the vehicle.

After their ride in the jeep it is normal for many of the dogs to be salivating. Onlookers should be made aware that the salivation has been brought about by the vehicle ride and does not indicate the dogs are rabid.

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.

HELP IN SUFFERING

ABC RECORDS GUIDE

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. Place kennel cards in the card holders provided on each kennel door.

OPERATIONS

1. 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 Operation 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 Operation Schedule into the ABC register.
5. The completed Operation 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. The dogs are loaded as described earlier.

- 4.** After the ABC staff 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 forms
6. 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. 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) Pain relief

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 is 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.

4) Anaesthesia

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 with palpebral reflex and jaw tone.

b. Propofol

4ml/10kg intravenous be aware that dog may stop breathing for a short while after induction, better to tube it and bag it 4 puffs a minute or if looking a bit blue, until it

starts breathing again. This can be topped up safely at 1ml/10kg as needed. Note will recover quickly from anaesthesia.

c.Ketamine in combination with xylasine or diazepam

When using ketamine for anaesthesia the dog may still swallow or blink briskly, do not top up unless moaning or moving.

Xylasine and Ketamine (xylasine 20mg/ml) (ketamine 50mg/ml) this gives 20 minutes surgical anaesthesia and fast recovery time

Use for puppies, or adults if needed.

Always keep puppies warm and never put on cold table or floor without rubber mat. After operation wrap up patient in bubblewrap if very cold weather.

Use 1/3 vol of xylasine to 2/3 vol of ketamine in same syringe

In a 10ml syringe put 3 ml xylasine 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 need 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

Xylasine and Ketamine

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

Give i/m

Should give xylasine 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 bubble wrap 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 their 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, day 7, 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 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 which 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 maintainance of certain levels of circulating Rabies antibodies. 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 recumbant, 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 recumbancy. 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. Recumbancy, 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 which may become rabid we humanely kill all animals which give cause 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 alternative to this course of action would be to kennel the animals for the entire incubation period which may be many months.)

Ocasionally 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 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 kenneling 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 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.

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 a 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 issues and statistical significance issues. 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 are 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. Estimates of total population in a city are not of great use scientifically, but may be needed for publicity purposes or to put before administrators. Initially it may be difficult to determine all the factors which 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.