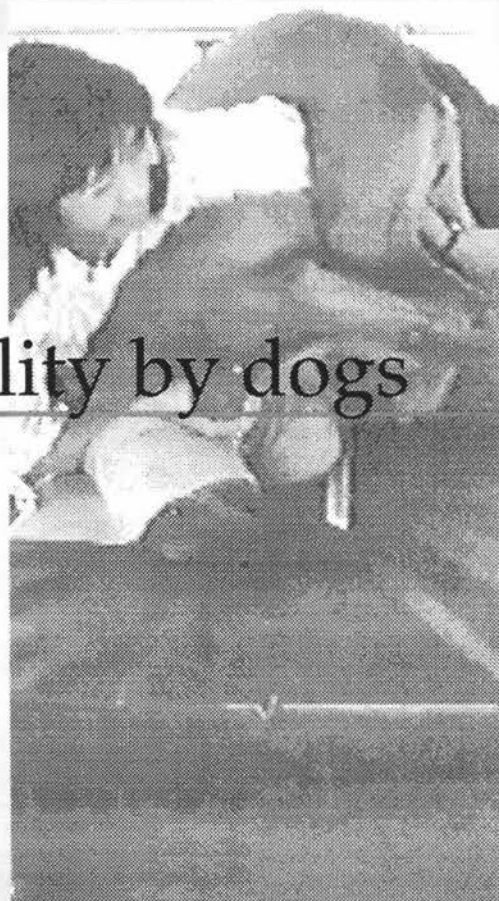


# Tonic immobility by dogs



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# **Tonic Immobility by Dogs**

A thesis presented  
in partial fulfilment of the requirements  
for the degree  
of Master of Veterinary Science  
in Veterinary Ethology  
at Massey University.

**ONG Rae Ming**  
**1993**

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# Abstract

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Tonic immobility (TI) is a state of relative immobility induced by restraint and presumed to function as a terminal defensive reaction. Although TI has been reported in a wide spectrum of species ranging from invertebrates to mammals, there have been very limited studies on TI by dogs.

The aim of this thesis was to determine the susceptibility and characteristics of TI in dogs so that the feasibility of using TI as a humane, quick, easily reversible, non-chemical and safe method of restraint for veterinary procedures could be assessed.

In an initial survey, 132 dogs were tested twice. Once by inversion and 30s restraint in the lateral position and once with an additional treatment (stroking, scruffing, blanket over head, cuff around ears or light into eyes) during the 30s restraint. Based on the criterion of remaining in the position restrained, without lifting its head off the test surface, for a minimum of 10s after release from restraint, 10 of the 132 dogs (7.6%) exhibited TI.

The characteristics of the dogs during TI were similar to those reported in other species, as the dogs remained very still, with the exception of occasional repositioning of heads and limbs, muscle tremors, twitches and paw movements. Swallowing, lip licking, blinking and occasional periods of eye closure were also observed but dogs had their eyes open throughout most of the TI episodes and appeared to be continually monitoring their environment as eye and ear movements, muscle twitches and changes in respiration rate were observed in response to auditory and other stimuli.

Many TI episodes were not terminated by intense stimulation such as loud auditory stimuli or physiological testing that included pinching between the dog's toes and inserting a thermometer into the dog's rectum. Respiration rate, heart rate, withdrawal reflexes and temperature were monitored on these dogs. These physiological parameters were all within normal limits.

Susceptibility to TI appeared to be a dog effect rather than a technique effect. Timid dogs or dogs that eliminated during testing were more susceptible to TI, indicating that susceptibility may be related to the dog's temperament or fearfulness. It was also found that proestrous bitches were more susceptible to TI than the other dogs.

A potentiation effect with repeated testing was observed when the intertrial interval was between 20 - 80s. No order or carry-over effect was however found when a 3 min intertrial

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interval was used. No difference in susceptibility to TI was found between techniques but the cuffing technique resulted in longer TI durations than the others.

Results should however, be interpreted with caution due to the small number of dogs exhibiting TI. More extensive investigations of the characteristics and physiological changes during TI and the effect of individual variables on TI susceptibility and durations are also required to determine the safety and extent of procedures that may be conducted while dogs are in TI. The results from this initial study are promising as they show that dogs do exhibit TI. The duration, characteristics and physiological changes observed during TI also indicate the potential for using TI as a quick, non-chemical, easily reversible and safe method of restraint in some dogs, for routine clinical examinations or even veterinary procedures.

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# Acknowledgements

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I would like to thank and acknowledge the collaboration of the Animal Health Service Centre at Jennersmead, Palmerston North SPCA and the dog breeders and owners that allowed me to test the dogs in their care. Special thanks to Olive Judd who introduced me to the dog breeding scene and to the breeders whose friendliness made the study more enjoyable. Approval of the Massey University Animal Ethics Committee is acknowledged.

I am also grateful to the Massey University Department of Veterinary Clinical Sciences and Robert Holmes for the opportunity to pursue my MVSc and for the position as a part-time Graduate Assistant in Veterinary Ethology. The supervision, encouragement and support from Robert Holmes who was always available to discuss problems while at Massey University and offered to read my manuscript while in Melbourne is warmly acknowledged. Thank you also to Norm Williamson for his patience reading my manuscript and for taking over as my supervisor. Statistical assistance from Greg Arnold, Ian Gordon and Teresa Dickinson is acknowledged.

Many thanks to Bruce Cann who was always helpful with equipment requirements and for modifying the caravan. The support and assistance from Leanne Fecser, Frances Allen, Nick Broomfield and Tom Law are also gratefully acknowledged. Thank you also to Brigitte Revol who shared our office and travails through our theses.

Support is acknowledged from the Victorian Institute of Animal Science and Paul Hemsworth who allowed me to use institute equipment and take leave for the final write-up of this thesis. Thanks too to Joanne O'Dwyer and Maria Costanzo for hunting down difficult references and to James Morris for keeping our project at VIAS running while I was on leave.

The assistance from my mother by typing the references is also gratefully acknowledged. Finally but most importantly thank you to Darren who was the assistant, video camera operator, photographer, caravan parking instructor, graphics designer, desktop publisher and moral supporter for this thesis both in Palmerston North during the experimental stage and back in Melbourne during the write-up as we both attempted to fit in a life together between full-time work and study. Thank you for the emotional support, patience, encouragement and for loving me.

Thank you too to Peebs, for initiating my interest in canine behaviour and for the loyal companionship during long days and nights writing up this thesis and for featuring in the preliminary study figures. The cooperation of all the dogs tested in this study and Smut who featured in Figures 4.11-15 was also greatly appreciated.

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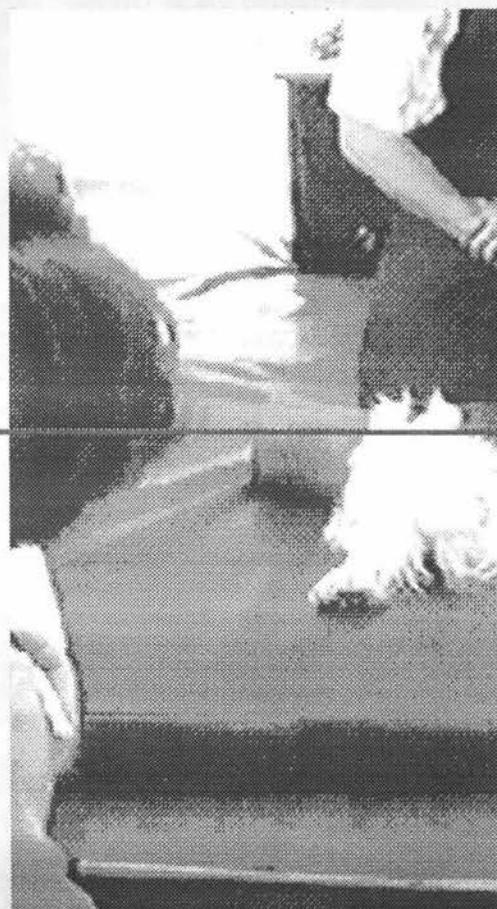
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# Chapter one

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## Introduction





# Introduction

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Tonic immobility or TI is a state of relative immobility induced by restraint and presumed to function as a terminal defensive reaction. Although it has been reported in a wide spectrum of species ranging from invertebrates such as insects, spiders and crustaceans to fish, amphibia, reptiles, birds and mammals including humans, there have been very few studies on TI by dogs. This is believed to be the first specific study of TI in non-experimental dogs. The aim of this thesis is to study the phenomenon of TI in dogs to determine the susceptibility and characteristics of TI in the species.

If dogs were susceptible to TI, the feasibility of using TI as a humane, quick, easily reversible, non-chemical and safe method of restraint for veterinary procedures could then be assessed. The advantages of being able to perform simple tasks like blood sampling or injections, that don't usually justify chemical methods, without having to fight with a struggling dog and risk damaging a vein or being bitten and stressing the dog, veterinarian, nurse and owner are self evident.

It may even be possible to perform other procedures such as minor stitch-ups or surgery (eg. grass seed or lump removal), ophthalmic or aural examination, abdominal or rectal palpation, catheterisation, nail clipping, skin scraping and radiology while an animal is in TI. Elimination of manual restraint for a struggling dog in radiology would mean sparing two to three people from possible irradiation. Clearer and fewer exposures would also result as the dog would be unlikely to move or struggle during the vital exposure period.

Although chemical restraint can be used, it may be contraindicated on some occasions, for example if the dog is in shock, with compromised circulatory or cardiac functions or has severe liver or kidney disease. Using TI as a form of restraint also means not having to worry if dog has recently been fed and so alleviates the need to wait 12-24 h before anaesthetising an animal for assessment, radiology or treatment. Owners could also bring their pets in for minor procedures without the need to starve the dog beforehand or to wait till the dog recovers sufficiently from anaesthesia before returning home. This would decrease the costs associated with overnight stays and anaesthesia.

In order to evaluate if TI could be used as a method of restraint for veterinary procedures in dogs, the first step was to determine whether dogs exhibit TI and the proportion of dogs that are susceptible. The duration and depth of TI were assessed to determine how long a dog remained immobile and the intensity and type of stimulation that caused termination of TI.

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The characteristics and physiological changes during TI (eg. whether there is analgesia associated with TI) also need to be assessed to determine the safety and feasibility of performing certain procedures during TI. Tonic immobility may for example, affect the cardiovascular, respiratory or nervous system in some dogs, thus making it unsafe for certain subjects. Whether TI interacts with drugs such as sedatives, analgesics, anaesthetics or other medications also needs to be evaluated.

The dog's behaviour at termination of TI is also important, as some species exhibit aggressive behaviour towards the investigator at termination. Behaviour at termination may also indicate how aversive TI is to the dog and thus whether TI is an humane alternative form of restraint for dogs. This is especially important if TI is to be induced several times in the same dog. The effects of repeated testing on TI susceptibility and duration need to be determined if TI is to be re-induced on several visits or perhaps even during a single visit if the response is not deep, or the duration of immobility is not long enough (eg. for several re-positionings for radiology).

Finally, other variables (eg. testing conditions, induction method, age, breed or temperament) affecting TI need identification in order to examine how they affect TI susceptibility and duration. Different methods of inductions may for example be more successful at inducing TI in certain categories of dogs. This information could then be used to identify susceptible dogs (eg. pups only) or be used to potentiate TI susceptibility or increase durations as a certain duration and depth of TI would be required for different procedures.

Extensive research is therefore required before it can be determined if TI is useful as a routine method of restraint for veterinary procedures. This study of TI in dogs attempted to determine the susceptibility of dogs to TI and its characteristics. From this, an indication of the proportion of dogs susceptible to TI, duration and depth of TI, characteristics and physiological changes during TI were ascertained. Some of the variables affecting TI susceptibility and duration were also identified and examined.

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