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Prevalence of reproductive disorders in bitches with special emphasis on mismating

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Abstract

Mismating refers to unintended copulation of a bitch during the receptive phase of the estrous cycle, often resulting in unwanted pregnancy requiring veterinary intervention. The present study was conducted at the Super Speciality Veterinary Hospital (SSVH), Visakhapatnam, Andhra Pradesh, to assess the occurrence of mismating among reproductive cases in dogs. Clinical records of 9,720 dogs presented between June 2025 and February 2026 were analysed. Of these, 45.89% were physiological reproductive conditions, while 54.11% were reproductive disorders. Pregnancy diagnosis was the most common physiological condition (24.03%), whereas pyometra (21.20%) was the predominant disorder. A total of 142 dogs (1.46%) had a history of mismating, of which 61.97% sought treatment. The highest incidence was recorded in Shih Tzu (20.45%), with nulliparous bitches (45.45%) being most affected. Accidental mating (25.00%), exposure to stray dogs (20.45%) and unwanted crossbreeding (15.91%) were the major causes.

Keywords: Canine mismating, estrous cycle, medical termination

1. Introduction

The domestic dog (*Canis lupus familiaris*) is one of the earliest domesticated animal species and remains an important companion animal worldwide. Dogs are maintained for various purposes including companionship, security, hunting, sporting activities and assistance to elderly or disabled individuals (Costa *et al.*, 2019) ^[1].

Reproductive disorders constitute a significant proportion of clinical cases presented in female dogs to veterinary hospitals (Beaudu-Lange *et al.*, 2021) ^[2]. Common conditions include vaginal disorders, uterine infections such as pyometra, gestational abnormalities including early embryonic death, fetal maceration and dystocia, lactational disturbances and neoplastic conditions affecting the genital tract and mammary glands (Gupta *et al.*, 2020; Fielding *et al.*, 2021) ^[3, 4]. Hormonal fluctuations during the estrous cycle, particularly variations in progesterone and estradiol, also influence reproductive physiology and predispose bitches to several reproductive pathologies (Maya *et al.*, 2017) ^[5].

Misamting incidents may occur due to accidental exposure to stray male dogs or mating with an undesirable male or a dog of a different breed. Even a single mating during the fertile period may result in pregnancy (Romagnoli, 2015) ^[6].

When future breeding potential needs to be preserved, medical management is often preferred over surgical sterilization to prevent or terminate unwanted pregnancy (Sridevi, 2015) ^[7]. However, treatment is recommended only after confirmation of pregnancy since many bitches presented for mismating may not conceive (Wanke *et al.*, 2002) ^[8]. Therefore, trans-abdominal ultrasonography is advised prior to administration of abortifacient drugs to avoid unnecessary exposure of non-pregnant animals to potential systemic side effects (Srinivas *et al.*, 2008) ^[9].

Considering the clinical importance of this condition, the present study was undertaken to evaluate the occurrence of mismating among dogs presented with reproductive complaints and to document their clinical characteristics and management practices.

2. Materials and Methods

The present study was conducted at the Super Speciality Veterinary Hospital (SSVH), Visakhapatnam, Andhra Pradesh. A retrospective epidemiological analysis was carried out to evaluate the occurrence of reproductive disorders in dogs presented to the hospital, with particular emphasis on mismating cases.

Clinical records of dogs presented with reproductive complaints between June 2025 and February 2026 were reviewed. During the study period, a total of 9,720 dogs were recorded with various reproductive conditions including pyometra, pregnancy diagnosis, pseudopregnancy, anoestrus, dystocia, canine transmissible venereal tumour and mismating. For each mismating case, relevant data were obtained from clinical records and owner history. The collected data was compiled and categorized to assess the occurrence pattern of mismating cases and associated epidemiological factors.

3. Results and Discussion

3.1. Overall Distribution of Reproductive Conditions, Age-wise Pattern and Incidence of Mismating

3.1.1. Distribution of Physiological and Pathological Reproductive Conditions

During the present investigation, a total of 9,720 dogs were presented with reproductive complaints. Among these, physiological reproductive conditions accounted for 45.89 per cent (4,461 cases), whereas reproductive tract disorders constituted 54.11 per cent (5,259 cases) (Table 1). The slightly higher proportion of pathological conditions indicates that reproductive disorders continue to represent a major component of clinical cases in canine practice.

Among the physiological conditions, pregnancy diagnosis (24.03%) and estrus detection (21.86%) were the most frequently recorded. The proportion of pregnancy diagnosis observed in the present study was higher than the 16.25 per cent reported by Gupta *et al.* (2020) [3] but comparable with (Sethi 2019) [10] (21.14%) and (Nagar *et al.*, 2008) [11] (25%). A slightly higher value of 29.09 per cent was reported by (Kumar *et al.*, 2011) [12], whereas (Oluwatoyin and Fayemi 2011) [13] documented a lower incidence of 8.1 per cent. Estrus detection accounted for 21.86 per cent of the cases, which closely agrees with (Gupta *et al.*, 2020) [3] (21.81%), while (Oluwatoyin and Fayemi 2011) [13] reported 6.1 per cent. The higher proportion of these physiological conditions likely reflects increased owner awareness regarding breeding management and reproductive monitoring.

3.1.2. Occurrence of Major Reproductive Disorders

Among the reproductive disorders, pyometra was the most frequently encountered condition (21.20%), highlighting its continued clinical importance in intact bitches. This observation was comparable with (Raju, 2017) [14] (20.3%), although higher incidences were reported by (Gupta *et al.*,

2020) [3] (23.25%), (Nagar *et al.*, 2008) [11] (31.77%), (Honparkhe *et al.*, 2010) [15] (40%) and (Singh *et al.*, 2013) [16] (40%). In contrast, lower incidences were reported by (Gibson *et al.*, 2013) [17] (2.2%), (Sathiamoorthy and Raja, 2011) [18] (3%), (Fukuda, 2001) [19] (15.2%) and (Jena *et al.*, 2013) [20] (16.72%). The variation among studies may be attributed to differences in population demographics, reproductive management practices and accessibility of veterinary care.

Dystocia constituted 13.43 per cent of the reproductive cases, emphasizing its clinical importance in canine obstetrics. Earlier reports indicate that dystocia occurs in approximately 5–7 per cent of canine births (Purohit *et al.*, 2004) [21], while (Nagar *et al.*, 2008) [11] reported incidences between 11.58 and 12 per cent. The occurrence of transmissible venereal tumour (TVT) was 8.48 per cent, which was higher than (Sathiamoorthy and Raja, 2011) [18] (1.4–3.27%) and (Joseph *et al.*, 2005) [22], but lower than (Kumar *et al.*, 2011) [12] (10.30%), (Nagar *et al.*, 2008) [11] (10.36%), (Singh *et al.*, 2013) [16] (30%) and (Honparkhe *et al.*, 2010) [15] (31%).

3.1.3. Occurrence of Other Reproductive Conditions

Other reproductive disorders recorded included pseudopregnancy (3.53%), vaginal hyperplasia (2.47%), vaginitis (1.41%), fetal resorption (1.06%), sub-involution of placental sites (0.71%) and anoestrus (0.35%) (Table 1; Fig. 1). The incidence of pseudopregnancy observed in the present study was comparable with (Honparkhe *et al.*, 2010) [15] (4%), (Kumar *et al.*, 2011) [12] (4.24%) and (Singh *et al.*, 2013) [16] (5%), whereas (Nagar *et al.*, 2008) [11] reported a higher value of 11.58 per cent. The relatively low occurrence of anoestrus compared with (Kumar *et al.*, 2011) [12] (6.06%) and (Nagar *et al.*, 2008) [11] (6.09%) may be related to variations in breed distribution, nutritional management and endocrine factors influencing reproductive cyclicity (Concannon, 2011) [23].

3.1.4. Age-wise Distribution of Reproductive Complaints

Age-wise evaluation revealed that the highest proportion of reproductive complaints occurred in dogs aged 1–5 years (44.50%), followed by 5–10 years (36.00%), while the lowest occurrence was observed in animals aged 10–15 years (19.50%) (Table 1). A similar age-related trend was reported by (Gupta *et al.*, 2020) [3]. The higher incidence in younger animals may be associated with increased breeding activity and the onset of reproductive life during this age period.

3.1.5. Incidence of Mismating

Out of the total reproductive cases examined, 142 dogs (1.46%) had a history of mismating. (Table 1). This proportion was lower than the 2.67 per cent reported by (Gupta *et al.*, 2020) [3] and 3.63 per cent reported by (Kumar *et al.*, 2011) [12], but slightly higher than (Dabhi, 2005) [24] (1.14%), indicating that accidental mating continues to represent an important reproductive management issue in dogs.

Table 1: Occurrence of Reproductive Conditions and Age-wise Distribution of Dogs Presented with Reproductive Complaints During the Study Period (n = 9,720)

Parameter	Category / Condition	Number of cases	Percentage (%)
Occurrence of reproductive conditions	Pregnancy diagnosis	2336	24.03
	Estrus detection	2125	21.86
Physiological conditions	Subtotal	4461	45.89
	Pyometra	2061	21.20
	Dystocia	1306	13.43
	Transmissible venereal tumour	824	8.48
	Pseudopregnancy	343	3.53

	Vaginal hyperplasia	240	2.47
	Mismating	142	1.46
	Vaginitis	137	1.41
	Fetal resorption	103	1.06
	Sub-involution of placental sites	69	0.71
	Anoestrus	34	0.35
Reproductive tract disorders	Subtotal	5259	54.11
	Total reproductive cases examined	9720	100
Age-wise distribution of reproductive cases	1–5 years	4325	44.50
	5–10 years	3499	36.00
	10–15 years	1896	19.50
	Total	9720	100

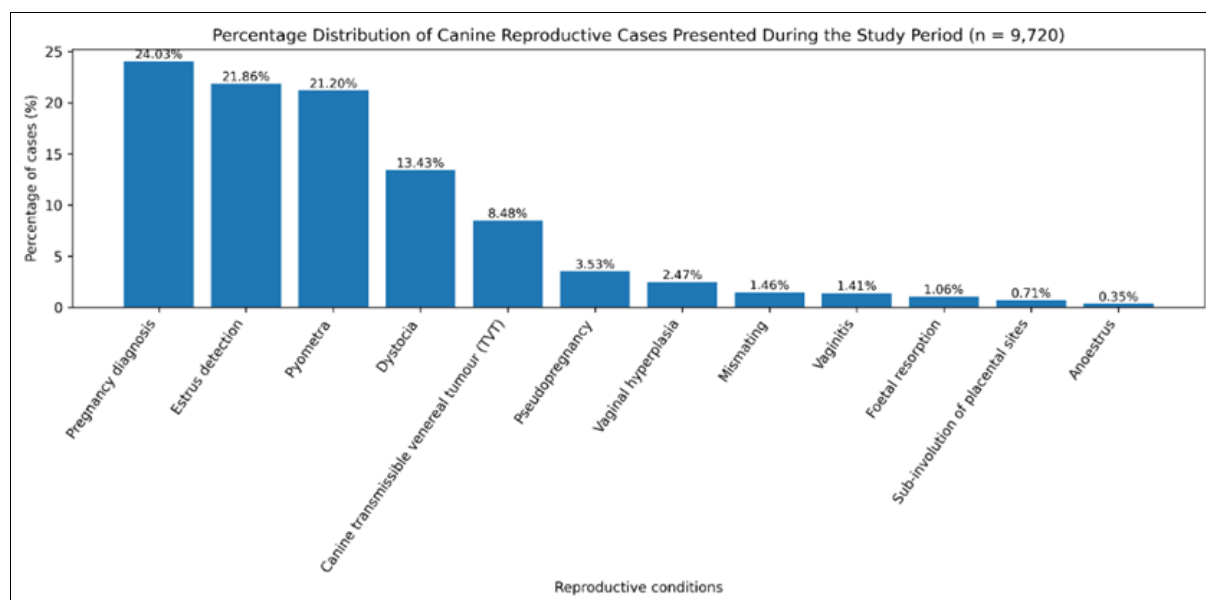


Fig 1: Percentage distribution of reproductive conditions in dogs presented to the Super Speciality Veterinary Hospital (SSVH) (n = 9,720).

3.2. Distribution of Mismating Cases According to Breed, Age and Parity

3.2.1. Breed-wise Distribution

Detailed evaluation of mismating cases (n = 88) revealed variations according to breed. Shih Tzu dogs constituted the highest proportion (20.45%), followed by Labrador Retriever (15.91%) and non-descript dogs (13.64%). Other breeds included Lhasa Apso (10.23%), Pug (9.09%), German Shepherd (9.09%), Maltese (7.95%), Beagle (6.82%) and Husky (6.82%) (Table 2). Similar breed-related patterns have been reported by (Gupta *et al.*, 2013) [25] and (Ajala *et al.*, 2011) [26], possibly reflecting the popularity of these breeds as companion animals.

3.2.2 Age and Parity-wise Distribution of Mismating Cases

Age-wise analysis revealed that the highest proportion of mismating cases occurred in bitches aged 1.5–4 years

(38.64%), followed by 4–6 years (29.55%), >6 years (20.45%) and less than one year (11.36%). Parity-wise evaluation indicated that nulliparous bitches constituted the highest proportion (45.45%), followed by primiparous (34.09%) and multiparous animals (20.45%). The higher incidence in young, sexually mature and nulliparous bitches may be attributed to increased estrous activity combined with inadequate owner awareness and insufficient breeding management during early reproductive cycles. Additionally, inexperience in detecting behavioral signs of estrus and failure to implement timely preventive measures may predispose these animals to unintended mating. These findings are in accordance with earlier reports of (Johnston *et al.*, 2001) [27] and (Root Kustritz, 2012) [28], who emphasized the importance of proper estrus monitoring and controlled breeding practices in reducing mismating incidents.

Table 2: Distribution of Mismating Cases According to Breed, Age and Parity (n=88)

Parameter	Category	Number	Percentage (%)
Breed	Shih Tzu	18	20.45
	Labrador Retriever	14	15.91
	Non-descript	12	13.64
	Lhasa Apso	9	10.23
	Pug	8	9.09
	German Shepherd	8	9.09
	Maltese	7	7.95
	Beagle	6	6.82
	Husky	6	6.82
	Subtotal	88	100
Age group	<1 year	10	11.36

	1.5–4 years	34	38.64
	4–6 years	26	29.55
	>6 years	18	20.45
	Subtotal	88	100
Parity	Nulliparous	40	45.45
	Primiparous	30	34.09
	Multiparous	18	20.45
	Subtotal	88	100

3.3. Owner-related Factors Associated with Mismatching

3.3.1. Reasons for Prevention of Pregnancy

Evaluation of owner-related factors revealed that accidental mating with a non-descript male dog was the most frequently reported reason for seeking prevention of pregnancy (25.00%), followed by suspected exposure to stray male dogs during proestrus (20.45%) and undesired cross-breeding with a different breed (15.91%) (Table 3). Other reasons included management constraints (13.64%), perception that the female was too young for breeding (10.23%), advanced age of the bitch (6.82%), and consanguineous mating with offspring (4.55%) or between siblings (3.41%). Similar observations have been reported by (Johnston *et al.*, 2001) ^[27].

3.3.2. Interval Between Mating and Clinical Presentation

With respect to the interval between mating and presentation,

the majority of animals were presented within 3–7 days of mating (38.64%), followed by presentation within one month (27.27%), 1–2 days (18.18%) and within 24 hours (15.91%) (Table 3). Early presentation is considered crucial for improving the effectiveness of therapeutic interventions aimed at preventing pregnancy.

3.3.3. Treatment Preference of Owners

Regarding treatment preference, 71.59 per cent of owners opted for medical management, whereas 28.41 per cent preferred surgical sterilization (Table 3). The higher preference for medical therapy may reflect the owners' intention to preserve the future breeding potential of their animals, similar to observations reported by (Root Kustritz, 2012) ^[28].

Table 3: Owner-related Factors Associated with Mismatching Cases (n=88)

Parameter	Category	Number	Percentage (%)
Reasons for pregnancy prevention	Accidental mating with non-descript male dog	22	25.00
	Suspected exposure to stray male dog during proestrus	18	20.45
	Mating with male dog of a different breed (undesired cross-breeding)	14	15.91
	Inadequate resources or inability to manage litter	12	13.64
	Female considered physiologically immature for breeding	9	10.23
	Female considered advanced in age for breeding	6	6.82
	Consanguineous mating with own offspring	4	4.55
	Consanguineous mating between siblings	3	3.41
	Subtotal	88	100
Interval between mating and presentation	Within 24 hours	14	15.91
	1 - 2 days	16	18.18
	3 - 7 days	34	38.64
	Within one month	24	27.27
	Subtotal	88	100
Treatment preference	Surgical sterilization	25	28.41
	Medical management	63	71.59
	Subtotal	88	100

4. Conclusion

The present study highlights the occurrence pattern of reproductive conditions in dogs presented to SSVH, Visakhapatnam. Pyometra emerged as the most common reproductive disorder, while pregnancy diagnosis and estrus detection constituted a substantial proportion of physiological presentations. Although mismatching accounted for a relatively small percentage of cases, it remains a clinically relevant issue, primarily associated with exposure of estrous bitches to free-roaming male dogs. The findings highlight the importance of improving owner awareness regarding estrous management and responsible breeding practices to minimize unintended mating and ensure timely veterinary intervention.

Conflict of Interest

Not available

Financial Support

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References

- Costa AS, Silva ME, Santos TR, Bisinoto MB, Tsuruta SA, Borges SB. A retrospective study of reproductive disorders in female dogs from the city of Uberlândia, Minas Gerais, Brazil. *Semina: Ciências Agrárias*. 2019;40:2299-2308.
- Beaudu-Lange C, Chastant-Maillard S, Fontaine E. Prevalence of reproductive disorders including mammary tumours in female dogs during their lifetime. *Frontiers in Veterinary Science*. 2021;8:673240.
- Gupta VK, Sharma A, Singh B. Incidence of reproductive disorders in bitches presented to veterinary clinics. *Indian Journal of Animal Reproduction*. 2020;41(1):34-39.
- Fielding HR, Gibson AD, Gamble L, Fernandes KA, Airikkala OI, Handel IG. Timing of reproduction and association with environmental factors in female free-roaming dogs in southern India. *Preventive Veterinary Medicine*. 2021;187:105249.
- Maya PD, Gonzalez DMS, Aranzazu TD, Mendonza N,

- Maldonado EJG. Histopathologic findings in uteri and ovaries collected from clinically healthy dogs at elective ovariectomy: a cross-sectional study. *Journal of Veterinary Science*. 2017;18:407-414.
6. Romagnoli S. Canine pregnancy termination. *Veterinary Clinics of North America: Small Animal Practice*. 2015;45(3):605-614.
 7. Sridevi P. Canine reproduction: the theory and practice. 1st ed. Hyderabad: Active Ads & Printers Pvt. Ltd.; 2015.
 8. Wanke MM, Gobello C, Monachesi N. Pregnancy termination in bitches. *Animal Reproduction Science*. 2002;73:151-156.
 9. Srinivas M, Vykunta Rao V, Veena P. Mismating in bitches. *Intas Polivet*. 2008;9:189-190.
 10. Sethi HS. Retrospective study on reproductive disorders in dogs. *Haryana Veterinarian*. 2019;58(1):87-90.
 11. Nagar SK, Chaudhary R, Sharma A. Incidence of reproductive disorders in dogs presented to veterinary clinics. *Indian Journal of Animal Reproduction*. 2008;29(2):191-194.
 12. Kumar P, Purohit GN, Mehta JS, Kumar A, Choudhary A, Saraswat CS, *et al.* Prevalence of reproductive disorders in the bitch. *Journal of Canine Development Research*. 2011;7:29-35.
 13. Oluwatoyin OA, Fayemi OE. A retrospective study of reproductive conditions and requested procedures in dogs in south-western Nigeria: 1999-2008. *Journal of Animal and Veterinary Advances*. 2011;10:26-27.
 14. Raju KGS. Studies on reproductive disorders in dogs presented to veterinary clinics. *Indian Journal of Veterinary Sciences*. 2017;87(4):456-459.
 15. Honparkhe M, Ghuman SPS, Kumar A, Dhaliwal GS. Studies on reproductive disorders in female dogs. *Indian Journal of Veterinary Research*. 2010;19(1):12-15.
 16. Singh B, Sharma A, Kumar R. Incidence of reproductive disorders in female dogs. *Indian Journal of Animal Reproduction*. 2013;34(2):67-70.
 17. Gibson A, Dean R, Yates D, Stavisky J. A retrospective study of pyometra in dogs. *Journal of Small Animal Practice*. 2013;54(6):296-301.
 18. Sathiamoorthy T, Raja S. Incidence of canine transmissible venereal tumour in dogs. *Indian Veterinary Journal*. 2011;88(9):79-80.
 19. Fukuda S. Incidence of pyometra in dogs. *Journal of Veterinary Medical Science*. 2001;63(4):487-489.
 20. Jena B, Rao KS, Reddy KC, Raghunath M. Clinical studies on pyometra in bitches. *Indian Veterinary Journal*. 2013;90(5):45-47.
 21. Purohit GN, Barolia Y, Shekhar C, Kumar P. Maternal dystocia in dogs: a review. *Asian Journal of Animal and Veterinary Advances*. 2004;2:69-79.
 22. Joseph C, Kumar A, Nair B. Incidence of transmissible venereal tumour in dogs. *Indian Veterinary Journal*. 2005;82:1152-1154.
 23. Concannon PW. Reproductive cycles of the domestic bitch. *Animal Reproduction Science*. 2011;124(3-4):200-210.
 24. Dabhi DM. Studies on reproductive disorders in dogs. *Indian Journal of Veterinary Science*. 2005;75:567-569.
 25. Gupta AK, Dhama AJ, Hadiya KK. Incidence of reproductive disorders in dogs. *Indian Journal of Field Veterinarians*. 2013;9:45-48.
 26. Ajala OO, Fayemi OE, Aderibigbe AO. Prevalence of reproductive diseases in dogs in Nigeria. *Journal of Veterinary Medicine and Animal Health*. 2011;3(4):45-49.
 27. Johnston SD, Root Kustritz MV, Olson PNS. Canine and feline theriogenology. 1st ed. Philadelphia: Saunders; 2001.
 28. Root Kustritz MV. Managing canine reproduction. *Veterinary Clinics of North America: Small Animal Practice*. 2012;42(3):543-557.

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