



ISSN: 2456-2912

NAAS Rating: 4.61

VET 2025; 10(5): 289-293

© 2025 VET

www.veterinarypaper.com

Received: 12-03-2025

Accepted: 18-04-2025

Mehendale Shruti Vidyesh

M.V.Sc Scholar, Department of
Veterinary, Surgery & AMP,
Radiology, KNPCVS, Shirwal,
Maharashtra, India

Dr. AH Ulemale

Associate, Professor and Head,
Department of Veterinary,
Surgery & AMP, Radiology,
KNPCVS, Shirwal, Maharashtra,
India

Dr. VM Salunke

Professor & AMP, DDR
Department of Veterinary,
Surgery & AMP, Radiology,
KNPCVS, Shirwal, Maharashtra,
India

Dr. SA Chauhan

Professor, Department of
Veterinary, Surgery & AMP,
Radiology, KNPCVS, Shirwal,
Maharashtra, India

Dr. SM Agivale

Assistant Professor, Department
of Veterinary, Surgery & AMP,
Radiology, KNPCVS, Shirwal,
Maharashtra, India

Dr. HP Aithal

Principal Scientist ICAR TEC-
IVRI, Pune, Maharashtra, India

Corresponding Author:

Mehendale Shruti Vidyesh

M.V.Sc Scholar, Department of
Veterinary, Surgery & AMP,
Radiology, KNPCVS, Shirwal,
Maharashtra, India

Evaluation of toggle pinning technique for surgical management of coxofemoral dislocation in dog

Mehendale Shruti Vidyesh, AH Ulemale, VM Salunke, SA Chauhan, SM Agivale, HP Aithal

DOI: <https://www.doi.org/10.22271/veterinary.2025.v10.i5e.2273>

Abstract

Coxofemoral luxation is one of the common orthopaedic problems encountered in dogs. Various methods of surgical management of coxofemoral luxation, and their complications have been studied. In this study, 8 dogs presented with coxofemoral luxation were selected and underwent toggle pinning for open reduction of the dislocated hip. For all cases, fiberwire suture was used as prosthetic ligament and titanium endobuttons were used as suture anchors. Post-operatively, clinical, radiographic and haematobiochemical evaluation was performed on day 15, day 30 and day 60. Post-operative relaxation occurred in one case with right coxofemoral luxation and multiple pelvic fractures. In 7 cases out of 8, weight bearing began by the 3rd-5th post-operative days and normal gait was observed by 60th day. No significant muscle atrophy or post-operative osteoarthritis was seen in any of the cases. Haematobiochemical parameters did not show any significant abnormality during the study period in any of the cases.

Keywords: Coxofemoral, luxation, toggle pinning, endobutton

1. Introduction

Joint luxations in dogs are some of the orthopaedic problems frequently encountered in veterinary practice. The hip joint is the most commonly luxated joint. Various methods have been utilised for management of hip luxation in dogs, including closed reduction and open reduction. Compared to closed reduction, the success rate after open reduction and stabilization is significantly greater (up to 85%), (Wardlaw and McLaughlin, 2018) [23]. Open reduction of coxofemoral luxations enables direct access to the joint, allowing for the removal of any hematoma and soft tissue trapped within the acetabulum, as well as the application of internal stabilization to secure the joint (Wardlaw and McLaughlin, 2018) [23]. Complications encountered with open reduction techniques include recurrence, sciatic nerve injury, injury to the femoral head, degenerative joint disease, etc. (Harasen 2005; Moores 2006) [10, 11, 15]. Toggle fixation for coxofemoral luxation was first described by Knowles *et al.* (1953) [1] and involves replacement of the round ligament of femoral head with fascia or braided nylon, stainless steel wire, heavy plastic suture or skin, according to various modifications made over time. The anchorage provided by the synthetic suture material in the place of the torn round ligament essentially substitutes the round ligament and further stabilises the coxofemoral joint (Ash 2012) [1]. The present study was conducted for evaluating the efficacy of toggle pinning for surgical management of coxofemoral luxation in dogs.

2. Materials and Methods

2.1 Case selection

Dogs presented with hind limb lameness were subjected to clinical and radiographic examination. Coxofemoral luxation was diagnosed by physical examination and orthogonal radiographic views and cases found appropriate for open reduction were selected for the study. Gait was analysed during physical examination and extent of lameness graded as per Bone *et al.* (1984) [4].

For each case, open reduction was performed by toggle pinning using Fiberwire suture material and titanium endobuttons as suture anchors.

2.2 Anaesthesia

For all cases, the anaesthetic protocol involved premedication with Inj. Atropine @ 0.04 mg/kg body weight subcutaneously (S/C) and Inj. Xylazine @ 1 mg/kg body weight intramuscularly (IM). Pre-operative antibiotic Amoxicillin sulbactam was administered at 12.5 mg/kg body weight intravenously (IV) and analgesic Meloxicam was given @ 0.5 mg/kg S/C. General anaesthesia was induced using Inj. Propofol @ 4 mg/kg body weight IV and Inj. Diazepam @ 0.2 mg/kg body weight IV. Endotracheal intubation was done after inducing general anaesthesia and anaesthesia was maintained using propofol as intermittent bolus injections.

2.3 Surgical procedure

A craniolateral approach was used for exposure of the hip joint. After exposing the hip joint, the acetabulum was cleared of debris, haematoma, or fibrin. Exposure to acetabular fossa was improved by outward rotation and adduction of the limb and the acetabular fossa was located. A hole was drilled in the acetabular fossa using a 3.5 mm diameter drill bit and the toggle pin i.e. endobutton with suture strand looped through it was pushed through the drilled hole to rest against the medial surface of the acetabulum, within the pelvic cavity. The remnants of the detached round ligament were cleared from the fovea capitis and a tunnel was created from the fovea capitis to the greater trochanter using a 2.7 mm drill bit. Using a guidewire, the suture strands attached to the toggle pin were fed through the tunnel. After reducing the joint, the ends of the suture strands were secured with a double surgeon's knot over the lateral surface of the femur, just below the greater trochanter, using a 2nd titanium endobutton.

The joint capsule was sutured using No. 2-0 polyglactin 910. The partially incised tendon of the deep gluteal muscle was sutured with simple interrupted sutures using No. 2-0 polyglactin 910. Closure of muscle and skin was routine.

2.4 Post-operative care

Oral antibiotic and analgesic was administered for 5 days post-operatively. No post-operative bandage was applied and the dogs were kept under restricted movement for the initial 4-5 post-operative days. Gradual increase in exercise was allowed over the next 7-10 days. Post-operatively clinical, radiographic and haemato-biochemical examination was performed at regular intervals i.e. 15th, 30th and 60th post-operative days. The operated site was checked for suture dehiscence, discharge, pain and crepitation. Lameness scores during evaluation of gait and measurements of mid-thigh circumference done at the post-operative intervals are described in Tables 2 and 3, respectively.

3. Results

The present study observed that among joint luxation of the extremities, coxofemoral joint luxation was most common. The occurrence of hip luxation was higher in non-descript dogs as compared to pedigree dogs, and was more in males than in females. Most cases of hip luxation in this study were recorded to be higher than 3 years of age, while some were between 1-2 years and 2-3 years of age. Hip luxation was comparatively less common in animals below 1 year of age.

Vehicular trauma was the cause of coxofemoral luxation in 10 cases, while slipping while playing and slipping while mating were the etiologies recorded in 2 cases. Spontaneous luxation was seen in one dog, with underlying moderate hip dysplasia. 1 dog showed bilateral coxofemoral luxation. Out of 8 dogs, 3 showed concurrent bone injuries, including long bone fracture and pelvic fracture. 1 dog showed moderate dysplasia in the opposite hip.

On an average, surgical intervention was performed 6 days after occurrence (min: 1, max: 15). Cases presented soon after occurrence showed easier reduction while extensive limb manipulation was required for reducing the luxated joint in long-standing cases.

In 7 cases, initial weight bearing started by 3rd-4th post-operative day. Lameness was significantly reduced by the 7th post-operative day, and progressive decrease in lameness was seen on the 15th and 30th day follow-up visits. By the 60th post-operative day, completely normal gait was observed in 7 cases, while 1 dog showed intermittent limping during walking.

Mid-thigh circumference was used as a measure of muscle atrophy and did not vary significantly in any of the cases, indicating that there was no significant muscle atrophy. Haemato-biochemical parameters remained within the normal limits throughout the study period.

Radiographic examination showed no osteoarthritic changes pre-operatively and post-operatively in 7 cases. 1 dog showed mild osteoarthritic lesions in pre-operative radiographs however, no further progression of these lesions was detected in post-operative radiographs done on day 15, day 30 and day 60 after surgery.

Relaxation occurred after 7 days in one dog, following pull-out of the implant through the acetabular canal. Pain, lameness and crepitation were noted in the affected limb. The dog subsequently underwent femoral head ostectomy and showed uneventful recovery after the surgery.

4. Discussion

Various methods of surgical correction of coxofemoral luxation have been studied in dogs, documenting the success rate and complications associated with these procedures (Beckham *et al.*, 1996; Trostel *et al.*, 2003; Venzin and Montavon, 2007; Rochereau and Bernard, 2012) [3, 20, 22, 18]. Previous studies on toggle pinning for repair of coxofemoral luxation have reported a success rate of around 64% and found complications such as infection, relaxation and breakage of the suture being used as prosthetic ligament (Ash *et al.*, 2012; Matthews and Barnhart, 2021) [1, 14].

In the present study, it was found that dogs undergoing surgical management of coxofemoral luxation by toggle pinning showed early weight bearing post-operatively. No post-operative development of osteoarthritis or muscle atrophy was seen. 1 out of 8 cases showed relaxation after surgery. Use of titanium endobuttons and fiberwire provided a stable construct for maintaining hip reduction.

5. Conclusion

The present study found that toggle pinning technique is a safe and effective technique for surgical management of coxofemoral luxation in dog. Potential for further research includes studies with longer duration of post-operative follow-up.

Table 1: Details of presented cases

Sr. No.	Side affected	Aetiology	Breed	Sex	Age (yrs)	Weight (kg)	Direction of luxation
1	Right	Slipping during mating	Indian Spitz	Female	4	16	Craniodorsal
2	Bilateral	RTA	Caravan hound	Male	4	25	Craniodorsal
3	Right	RTA	Lhasa Apso	Male	3	15	Craniodorsal
4	Right	RTA	Non-descript	Male	3	30	Craniodorsal
5	Right	RTA	Indian Spitz	Male	14	11	Craniodorsal
6	Left	Slipping during play	Golden Retriever	Female	1	22	Craniodorsal
7	Right	RTA	Non-descript	Male	1	9	Craniodorsal
8	Right	RTA	Non-descript	Male	5	20	Craniodorsal

Table 2: Lameness scores of each case at various post-operative intervals

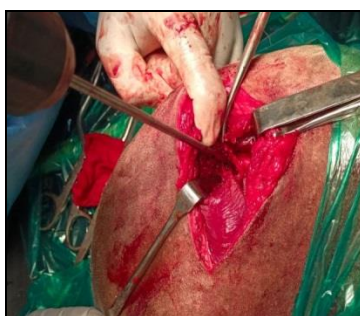
Case No.	Day 0	Day 15	Day 30	Day 60
1	3	2	1	0
2	3	1	0	0
3	3	1	1	0
4	3	2	2	1
5	3	2	0	0
6	3	1	0	0
7	3	1	0	0
8	3	0	0	0

Table 3: Mid-thigh circumference of each case at various post-operative intervals

Case No.	Mid-thigh circumference (cm)			
	Day 0	Day 15	Day 30	Day 60
1	26cm	24cm	24cm	24cm
2	29.5cm	24.4cm	28cm	28cm
3	24.6cm	24.2cm	25cm	25cm
4	31.5cm	31.2cm	32.5cm	32.8cm
5	21cm	20cm	20.8cm	22cm
6	27cm	26cm	26.5cm	26.5cm
7	15.2cm	15cm	14.8cm	15cm
8	32.5cm	32.9cm	32cm	32cm

Weight-bearing on 3rd post-operative dayWeight-bearing on 7th post-operative day

Exposure of acetabulum



Drilling of acetabulum canal using 3.5 mm drill bit



Passing endobutton and suture through acetabular canal



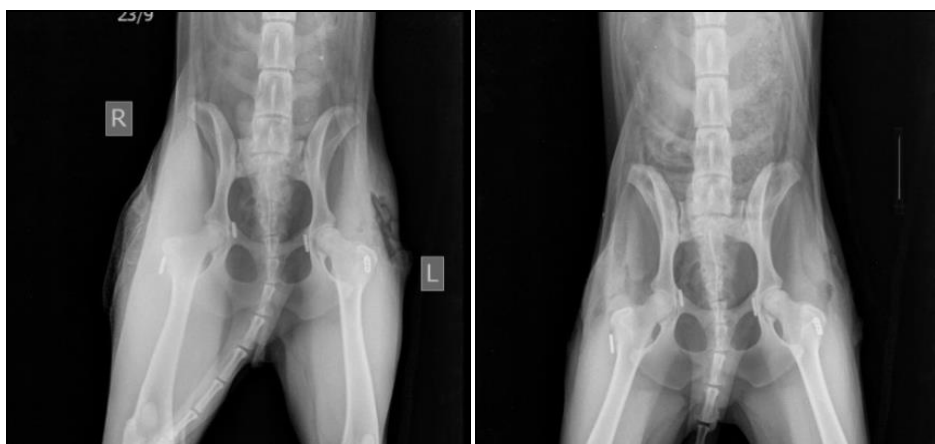
Drilling of femoral canal using
2.7mm drill bit

Tightening of suture knot over 2nd
endobutton

Closure of skin incision



Radiographs of case no. 2-Pre-operative and immediate post-operative (VD view)



Radiograph of case no 2 on day 15

Radiograph of case no 2 on day 30



Radiograph of case no 2 on day 60

Conflict of Interest

Not available

Financial Support

Not available

6. Reference

- Ash K, Rosselli D, Danielski A, Farrell M, Hamilton M, Fitzpatrick N. Correction of craniodorsal coxofemoral luxation in cats and small breed dogs using a modified Knowles technique with the braided polyblend TightRope™ systems. *Vet Comp Orthop Traumatol*. 2012;25(01):54-60.
- Basher AW, Walter MC, Newton CD. Coxofemoral luxation in the dog and cat. *Vet Surg*. 1986;15(5):356-362.
- Beckham HP, Smith MM, Kern DA. Use of a modified toggle pin for repair of coxofemoral luxation in dogs with multiple orthopedic injuries: 14 cases (1986-1994). *J Am Vet Med Assoc*. 1996;208(1):81-84.
- Bone DL, Walker M, Cantwell HD. Traumatic coxofemoral luxation in dogs: results of repair. *Vet Surg*. 1984;13(4):263-270.
- Budhwar P, Kalita D, Dutta J, Singh CK, Sinha S. Analysis of selected biochemical parameters in dogs after coxofemoral joint affections, 2021.
- Demko JL, Sidaway BK, Thieman KM, Fox DB, Boyle CR, McLaughlin RM. Toggle rod stabilization for treatment of hip joint luxation in dogs: 62 cases (2000-2005). *J Am Vet Med Assoc*. 2006;229(6):984-989.
- Denny HR, Butterworth SJ. The hip. A guide to canine and feline orthopaedic surgery. 4th Ed. Blackwell Science Ltd, 2000, p. 455-467.
- Engstig M, Vesterinen S, Morelius M, Junnila J, Hyttiäinen HK. Effect of femoral head and neck osteotomy on canines' functional pelvic position and locomotion. *Animals*. 2022;12(13):1631.
- Garnier P, Cabon Q, Collard C, Guillaumot P, Dembour T. Outcome and complications following modified prosthetic capsule technique for treatment of craniodorsal hip luxation in dogs. *Can Vet J*. 2023;64(8):758-764.
- Harasen G. Coxofemoral luxations part 1: Diagnosis and closed reduction. *Can Vet J*. 2005a;46(4):368.
- Harasen G. Coxofemoral luxations-Part 2: Surgical options. *Can Vet J*. 2005b;46(6):546.
- Höim R, Andrianov V, Lenzner A. Use of modified toggle pin technique for management of coxofemoral luxations in dogs: A review of literature and a report of two cases. *J Agr Sci*. 2003;14:203-208.
- Karlı B, Kumandaş A, Bakıcı M. Evaluation of the treatment of traumatic coxofemoral luxations in dogs using toggle pin technique. *Harran Univ Vet Fak Derg*. 2022;11(2):232-238.
- Mathews ME, Barnhart MD. Risk factors for reluxation after toggle rod stabilization for treatment of coxofemoral luxation in 128 dogs. *Vet Surg*. 2021;50(1):142-149.
- Moore A. Decision making in the management of hip luxations in dogs and cats. In *Pract*. 2006;28(10):570-576.
- Piermattei DL, Flo G, Brinker WO. The hip joint. In: *Handbook of small animal orthopedics and fracture repair*. 5th ed. Elsevier, 2016, p. 476-477.
- Piermattei DL, Johnson KA. An atlas of surgical approaches to the bones and joints of the dog and cat. 4th ed. Saunders, 2004, p. 290-295.
- Rochereau P, Bernardé A. Stabilization of coxo-femoral luxation using tenodesis of the deep gluteal muscle. *Vet Orthop Traumatol*. 2012;25(01):49-53.
- Santos R, Oronan R, Reyes M. Age, weight, breed, and trauma as risk factors for coxofemoral luxation in dogs. *Philipp J Vet Med*. 2021;58:159-166.
- Trostel CD, Peck JN, deHaan JJ. Spontaneous bilateral coxofemoral luxation in four dogs. *J Am Anim Hosp Assoc*. 2000;36(3):268-276.
- Uchio Y, Ochi M, Sumen Y, Adachi N, Kawasaki K, Iwasa J, *et al*. Mechanical properties of newly developed loop ligament for connection between the EndoButton and hamstring tendons: Comparison with Ethibond sutures and Endobutton tape. *J Biomed Mater Res*. 2002;63(2):173-181.
- Venzin C, Montavon PM. Augmentation of the transverse acetabular ligament in canine caudoventral hip luxation. *Vet Orthop Traumatol*. 2007;20(04):320-323.
- Wardlaw JL, McLaughlin R. Hip luxation. In: *Veterinary Surgery: Small Animal*. 1st Ed. Elsevier, 2018, p. 956-964.

How to Cite This Article

Vidyesh MS, Ulemale AH, Salunke VM, Chauhan SA, Agivale SM, Aithal HP. Evaluation of toggle pinning technique for surgical management of coxofemoral dislocation in dog. *International Journal of Veterinary Sciences and Animal Husbandry*. 2025;10(5):289-293.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.