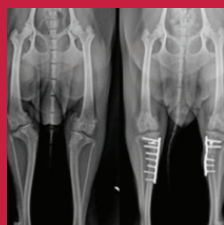


Antinol® Case Study Contest

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Case Report :
Use of PCSO-524® Combined with
Surgical Treatment of Patellar luxation
in Dogs



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Abstract

Five dogs with bilateral patellar luxation were presented at the Small Animal Hospital of Faculty of Veterinary Medicine, Chulalongkorn University. Four dogs had grade 2, 3, and 4 medial patellar luxation in 3, 3, and 2 stifle joints, respectively. One dog had grade 3 bilateral lateral patellar luxation that had recurrent patellar luxation of left stifle joint for 6 months after previous surgery. All dogs were had surgical treatment to re-align and stabilize extensor mechanism in the normal position. The dogs received anti-inflammatory drug and PCSO-524® in combination with rehabilitation to restore normal limb function and muscle mass postoperatively. All dogs achieved good outcomes when compared with pre-operation. Range of motion was normal in all dogs and the patellae were in the normal position. However, one stifle with previous reluxation and severe osteoarthritis had slightly crepitation when flexed and extended the stifle joint. Patellar luxation causes abnormal wear of the patella and trochlear ridges leading to lameness, muscle pain, and osteoarthritis. The treatment focuses on stabilization of the stifle joint and restore limb function. Surgical treatment is recommended in most cases. Rehabilitation provides strengthen muscle, improves normal joint function, enhances limb function, and prevents complications. Despite successful treatment for correcting patellar luxation, osteoarthritis remains occurrence in most cases. Therefore, use of anti-inflammatory supplement such as PCSO-524® is important for long-term management with less side effect and safety for long-term use when compared with non-steroidal anti-inflammatory drugs.

Keywords: Osteoarthritis, patellar luxation, PCSO-524®, surgical treatment, rehabilitation

Introduction

Patellar luxation causes malalignment of quadriceps muscle group resulting in abnormal extensor mechanism and muscle atrophy. Bowlegged and femoral or tibial torsion can be found in severe cases. Patellar luxation results in abnormal grind between patella and femoral trochlear ridges leading to osteoarthritis. Surgical treatment is recommended to re-align extensor mechanism and prevent abnormal wear of patella and trochlear ridges. In addition, rehabilitation is used to restore muscle and joint function and to control osteoarthritis. This case report presented the outcome of surgical treatment in combination with rehabilitation and nutraceutical use in vary degrees of patellar luxation in order to provide the guideline for treatment.

Case history

Five dogs consisting of 3 Pomeranians, 1 Chihuahua and 1 mixed breed dogs were diagnosed with patellar luxation and they did not have other concomitant stifle problems i.e. cranial cruciate ligament rupture (Table 1).

Table 1. Demographic information and history of illness

Dog	Breed	Age (Month)	Gender	Weight (kg)	BCS	Illness history
1	Pomeranian	48	Male, intact	3	2.5/5	Alopecia X Left hip luxation
2	Pomeranian	18	Male, neutered	4	4/5	Alopecia X
3	Chihuahua	52	Male, neutered	3	3/5	-
4	Pomeranian	10	Female, intact	2.6	3/5	-
5	Mixed breed	18	Female	13.4	3/5	-

BCS: Body condition score

Case 1: He could not weigh his left hind limb and he was diagnosed as left hip luxation, grade 3 left medial patellar luxation (MPL), and grade 2 right MPL. The dog was treated hip luxation by using closed reduction and Ehmer sling for 10 days, in combination with PCSO-524® 1 sid for 2 months before stifle surgery.

Case 2: The dog had bilateral grade 3 MPL with both hind limbs lameness (score 2). He did not receive any treatment before surgery.

Case 3: The dog had bilateral grade 2 MPL with left hind limb lameness (score 2). He was treated with non-steroidal anti-inflammatory drug (NSAID) for 8 days and PCSO-524® 1 bid for 1 month.

Case 4: She had left hind limb lameness (score 3) and limited stifle in extension. The symptoms emerged since the dog was 3 months old without any treatment. She had bilateral grade 4 MPL.

Case 5: The dog had bilateral grade 3 LPL and she received previous surgical correction on left stifle 5 months ago but she had recurrent left LPL with lameness (score 3). The dog continuously received PCSO-524® 1 bid since the previous operation.

Physical examination

All dogs received orthopedic examination and assessment of lameness score of each leg as shown in table 2 and 3.

Table 2. The severity of patellar luxation and surgical techniques used in each stifle joint

No	Patellar status	1	2	3	4	5	6	7
1	Right MPL 2	✓		✓	✓	✓	✓	
	Left MPL 3	✓				✓		
2	Right MPL 3	✓	✓	✓	✓			
	Left MPL 3	✓		✓	✓			
3	Right MPL 2	✓		✓		✓		
	Left MPL 2	✓		✓		✓		
4	Right MPL 4	✓	✓	✓	✓			✓
	Left MPL 4	✓	✓	✓	✓			✓
5	Right LPL 3	✓	✓	✓		✓	✓	
	Recurrence of left LPL 3	✓ [*]	✓	✓		✓	✓	

1: Trochlear block recession, 2: Desmotomy, 3: Imbrication, 4: Tibial tuberosity transposition, 5: Patelloplasty, 6: Patellar antirotational suture, 7: Proximal tibial osteotomy

*Adjust the recessed groove

Diagnostic plan and results

All dogs received radiographic examination of the pelvic limbs in order to rule out other problems including hip disease and osteoarthritis. The dog numbers 1, 2, 4, and 5 were further examined for pelvic limb deformity by using computer tomography. Tibial torsion was found in the 4th dog. Hematology was also used to screen for health status before surgery. All dogs had normal values of hematological parameters throughout the study.

Treatment

All stifle joints were operated in order to provide stability. The operation was performed on each joint 1-3 months apart in each dog. Synovitis and cartilage erosion of femoral groove and patella were recorded (Figure 1). Surgical procedures for each stifle joint was shown in table 2.

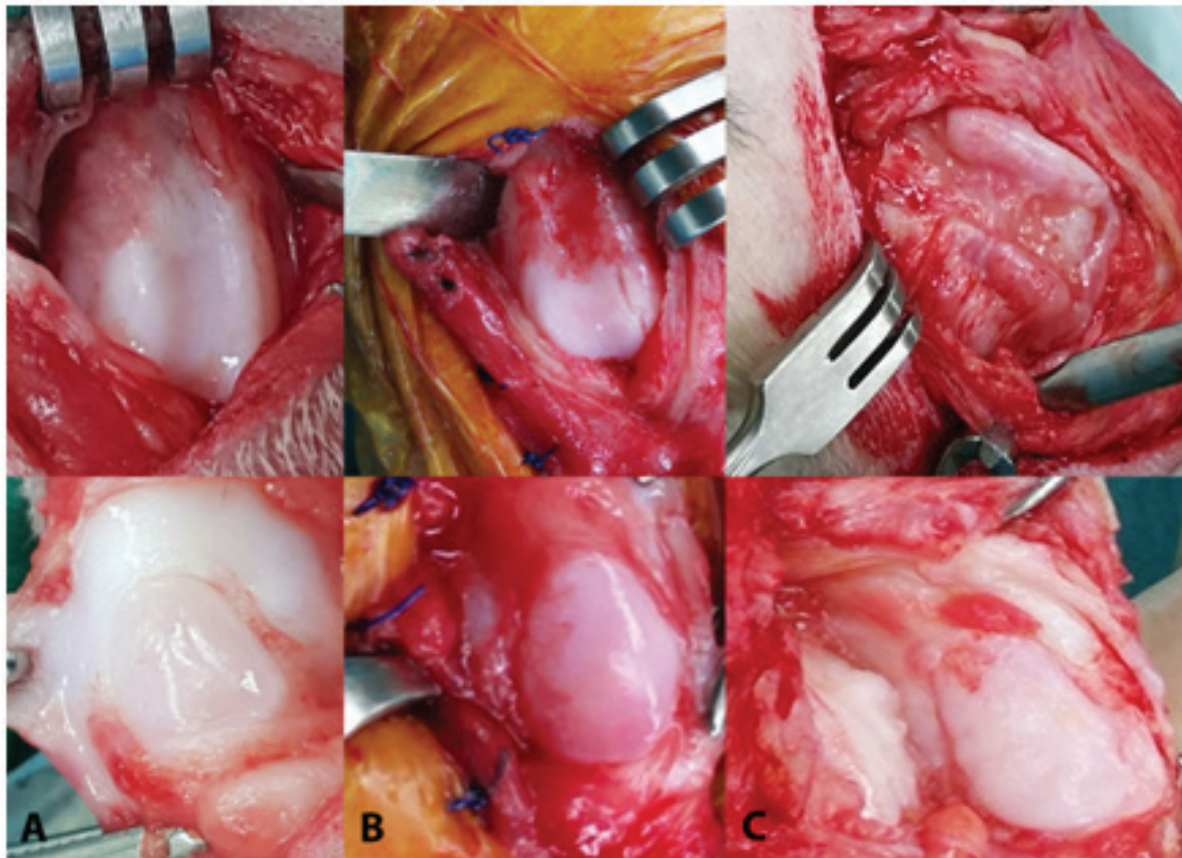


Figure 1. Femoral groove and patellar lesion of the dog numbers 2, 4, and 5

Treatment outcome and follow up

All dogs received cefazolin (25 mg/kg) for 7 days and carprofen 2.2 mg/kg bid for at least 2 weeks in combination with PCSO-524® 1 bid for 2 weeks then the dosage was reduced individually after surgery. The dogs were restricted to short leash-walks for 6 weeks and they were evaluated for pain and limb use at 2, 4, 6, 8, 10, and 12 weeks after surgery. Rehabilitation were assigned in all dogs until they had normal limb function and muscle mass. Lameness score and surgical procedures were shown in table 3.

Case 1: The operation was performed on each stifle joint at 11 weeks apart. The dog was able to bear his weight at 2 weeks after surgery. Ultrasound therapy of stifle joint and quadriceps muscle was used for rehabilitation together with treadmill walking once a week. The dog was able to use his legs normally within 4 weeks after surgery. Both patellae were in the normal position without crepitation when flexed and extended and range of motion became normal. However, muscle atrophy of both limbs remained until the 10th week after surgery and the muscle tight became normal at 12 weeks after rehabilitation. Radiographic images were taken approximately 1 year after surgery to follow up any bone change (Figure 2).

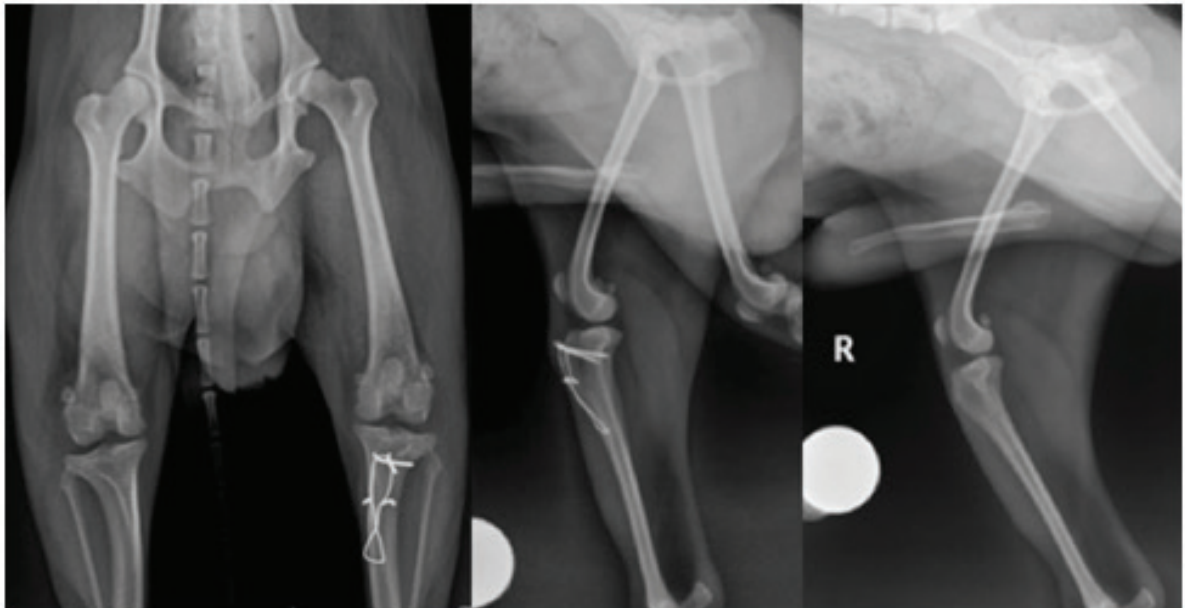


Figure 2. Radiographic images of the 1st dog after surgery on the 2nd limb for 1 years.

Case 2: The operation was achieved on each stifle joints at 11 weeks apart (right and left). Two weeks after the operation on each leg, the dog was able to bear his weight and rehabilitation was started with ultrasound therapy in combination with balancing exercise and treadmill walking once a week. The dog was able to use the right and left legs normally without pain at 3 and 4 weeks after surgery on each leg, respectively. Rehabilitation was continued for 12 weeks after the operation of the 2nd leg (left). The dog was assigned to treadmill walking at home every day. Left patella was in the femoral trochlear groove without crepitation when flexed and extended. Both stifle joints had normal range of motion, but muscle atrophy of right limb remained until the 6th week after surgery. There was slight crepitation of the right stifle joint when stifle in extension with some degree of patellar subluxation to medial direction. The dog received alternate administration of glucosamine/chondroitin sulfate (Synoquin®) 1 sid and PCSO-524® 1 sid daily for 3 months. Right patella became stable without crepitation at 47 weeks after surgery.

Case 3: The operation was performed on each of stifle joints at 12 weeks apart (right and left). Two weeks after the operation on each leg, rehabilitation was started with laser to reduce pain in combination with balancing exercise and weight training once a week. The dog was able to bear his weight without lameness at 4 weeks after surgery on each leg. The patella was in the normal position without crepitation when flexed and extended. Range of motion was normal without pain when palpation. The quadriceps muscle of right leg was slightly tight, so ultrasound therapy was particularly applied on this area for 2 more weeks until normal. The rehabilitation was continued for 8 weeks after surgery of the 2nd leg; however, left tight muscle showed slightly less circumference (14.5 cm) when compared to that of the right limb (15 cm).

Case 4: The dog suffered from grade 4 MPL with distal tibial torsion. The surgery was started on the right stifle joint and bandage was applied for 3 days. Rehabilitation consisting of ultrasound therapy and balancing exercise was started at 2 weeks after surgery and scheduled every 2 weeks. The dog was unable to fully bear weight nor extend the stifle joint and the muscle remained atrophy since prior to the operation. Four weeks after surgery, the weight bearing and range of motion were better, but Achilles tendon had slightly lost flexibility. Internal rotation of the foot was found. The patella was in the femoral groove without crepitation when flexion or extension the stifle joint. The muscle circumference had increased by the 4th week after surgery. The weight bearing of the right leg was improved at 8 weeks after surgery, but left leg became worse. Therefore, surgery was appointed on left stifle joint. She could bear weight on left leg at the first week after surgery with good improvement and the rehabilitation was started. The limb function was improved but external rotation still slightly remained and stretching of both hock joint while walking was observed occasionally at 4 weeks after surgery. At this point, the dog was able to partially stretch the left stifle joint and left quadriceps muscle was tight. Radiographic images of the operated joint were taken before and 1 month after the left leg operation (Figure 3). At 10 weeks after surgery of the 2nd leg, the right leg had normal alignment, joint angle, and limb function with improvement of muscle mass. However, muscle atrophy and external rotation of the left leg slightly remained. Hydrotherapy was started at this point.

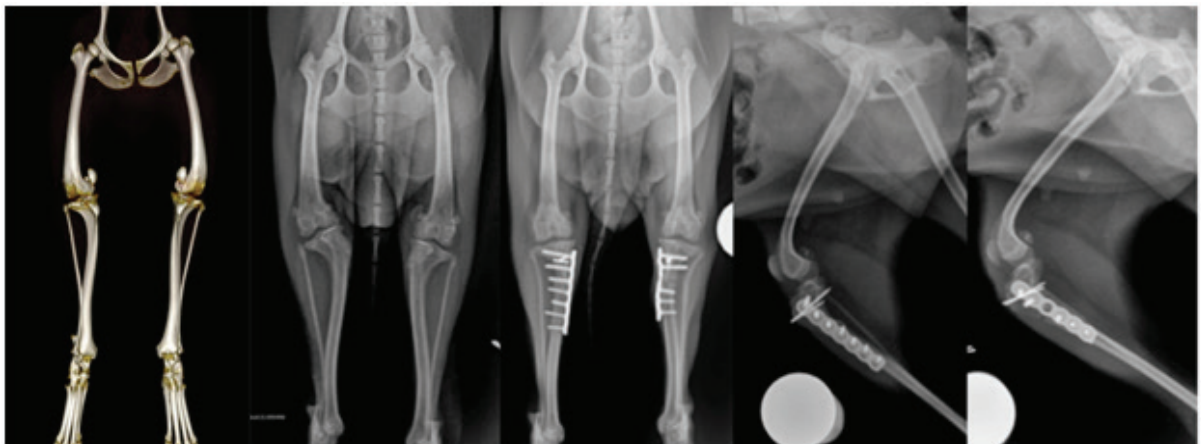


Figure 3. 3D and radiographic images of the 4th dog before and 1 month after surgery on the 2nd limb for 1 month

Case 5: The dog could bear weight at 1 week after surgery of left stifle joint. Rehabilitation also started at that time with alternate use of laser and ultrasound therapy and electrical stimulation was applied 1-2 times per week. The patella was in the normal position with slightly crepitus found when flexed and extended stifle joint at 2 weeks after surgery. Limited stifle flexion and pain when stretching was indicated. She could not bear weight on the right hind limb so surgery was planned to prevent excess weight bearing on the left stifle joint. Weight bearing obviously improved at 1 week after surgery. Both patellae were in the normal position with slightly crepitus found on left stifle in flexion and extension at 2 weeks after surgery on the right stifle joint and range of motion became normal at 3 weeks after surgery. The left patella showed slightly medial patellar subluxation while stretching which resumed normal at 4 weeks after surgery. The dog had normal limb function and range of motion at 6 weeks after surgery. The patellae were in the normal position but slightly crepitus found when flexed and extended left stifle joint. At 17 weeks after surgery of the 2nd leg, the dog had normal limb function with mild lameness of the left leg at trot, crepitation still found when flexed or extended left stifle joint, muscle mass and range of motion fully recovered. The dog received 1 sid of PCSO-524[®] every day.

Table 3. Preoperative and postoperative lameness scores and PCSO-524[®] use in each dog

Dog No	Patellar status	Lameness score* (Week)							PCSO-524 [®] Treatment
		0	2	4	6	8	10	12	
1	Left MPL 3	3	2	0	0	0	0	0	Continued until present
	Right MPL 2	2	1	0	0	0	0	0	
2	Right MPL 3	2	2	1	0	0	0	0	1 sid for 3 months
	Left MPL 3	2	2	0	0	0	0	0	
3	Right MPL 2	2	2	1	0	0	0	0	Throughout 7 months of treatment
	Left MPL 2	1	1	0	0	0	0	0	
4	Right MPL 4	3	2	2	1	1	1	0	1 bid for 6 weeks then
	Left MPL 4	3	2	2	1	1	0	0	1 bid for 3 months
5	Recurrence of left	3	3	2	2	1	1	1	1 bid until present
	LPL 3 Right LPL 3	3	2	1	0	0	0	0	

*Lameness score 0: No lameness; 1: Mild lameness, normal at walk with mild lameness at trot; 2: Moderate lameness, lameness at walk and increased lameness at trot; 3: Severe lameness; 4: Non-weight bearing lameness (Hazewinkel et al., 2008)

Discussion

Patellar luxation is a common problem especially in small breed dogs (2). It causes impaired limb function, abnormal walking, lameness, and muscle atrophy. Patellar luxation results in synovitis and patellar mal-tracking leading to cartilage erosion, osteoarthritis, and severe chronic pain (3). A previous study reported that cartilage lesions were found on both patella and femoral trochlear ridge in dogs with patellar luxation (4). Treatment is aimed to re-establish patella on the femoral trochlear sulcus and to provide joint stability. Rehabilitation is provided to restore muscle and joint function while PCSO-524® is used to reduce joint inflammation. Three dogs in this study received PCSO-524® in combination with NSAIDs prior to the operation because of pain, which was decreased after the administration. The outcome of the surgical treatment was favorable in all dogs. Patellae were in the normal position, the limb function was improved compared to that before the operation and range of motion was normal. The surgical treatment contributed to the decreased chance of osteoarthritis developed from abnormal grinding of the patella. One stifle joint had slightly crepitus at flexion and extension because of previous recurrent patellar luxation and severe osteoarthritis. All stifle joints in this study had cartilage abrasion caused by the abnormal wear of patella and femoral trochlear groove indicating chronic osteoarthritis. Roy et al found that osteoarthritis could occur even the surgical treatment was performed in dogs with patellar luxation (5). Inflammation of joint disease and osteoarthritic pain should be concerned. Therefore, the dogs in this study received PCSO-524® in combination with NSAID, but NSAID was only used for a short period of time. NSAIDs are contradicted for long-term use due to their side effects. PCSO-524® is therefore an appropriate alternative option in osteoarthritic animals. It can be used for long period without adverse effects. It is consisted of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which are omega-3 fatty acids that can prohibit the inflammatory mediators (6-7). Another component of PCSO-524® is eicosatetraenoic acid (ETA), which attaches to active binding site of the enzymes that use arachidonic acid as substrate resulting in anti-inflammatory property of PCSO-524® (6, 8).

Conclusion

Treatment of patellar luxation is aimed to stabilize the extensor mechanism of the stifle joint, to re-establish normal limb function, and to prevent the development of osteoarthritis from abnormal wear of patella and femoral trochlear ridge. Rehabilitation is provided to restore muscle and joint function as well as nutraceutical i.e. PCSO-524® is used to decrease joint inflammation and to manage osteoarthritis caused by patellar luxation.

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