“My therapy is quite simple: I wag my tail and lick your face until you feel good about yourself again.”
Rx

Prozac

Scotties
LUXATING PATELLA

& CRUCIATE LIGAMENT

INJURY

IN THE

SCOTTISH TERRIER

George Procento, MD       Scottish Terrier Club of Chicago           January 15, 2006
Loose Kneecap in the Scottish Terrier & How it Can Increase Risk of Serious & Permanent Knee Injury
NERA
1992 - 2004

- CMO * (age 4-7 mo.)
- LUXATING PATELLAE
- CRANIAL CRUCIATE LIGAMENT INJURY (age 8+ yrs.)
- KIDNEY FAILURE (age 11+ yrs.)

* CranioMandibularOsteopathy (Jan. 2005 – STCC Presentation)
XRAY of NERA
4 month old
Scottish Terrier with
Early Signs of CMO
(CranioMandibularOsteopathy)

ARROWS: Areas of HyperOstosis / Abnormal Increase in Bone Growth / Density

Courtesy of Sheree Block, DVM, Buffalo Grove, IL
XRAY of Dog With Severe CMO

Dog skull from an extremely severe case of CMO


Courtesy of D. Rosenstein, DVM (MSU Vet. Radiology)
from U. Mostosky, DVM (MSU)
NERA
1992 - 2004
http://clubs.akc.org/stca
Scottish Terrier Club of America
Daniel A. Degner, DVM, DACVS
Auburn Hills, Michigan

Doctor of Veterinary Medicine
1986 - 1990

Internship - Small Animal Medicine and Surgery
1992 - 1993

Residency - Small Animal Surgery
1993 – 1996

Vetsurgerycentral.com
Special Surgery

Our goal is to provide your pet with the highest caliber of care, to ensure the most successful outcome following surgery, and provide you with the best service possible.
Patellar Luxation

(Slipped stifles)

CLICK ON THE TOPIC YOU WANT TO READ ABOUT BELOW:

[What the patella is and what it does] [Medial Patellar Luxation] [Grade I] [Grade II] [Grade III] [Grade IV] [Considerations] [Recognizing the problem] [Three Steps to Sound Stifles]

WHAT THE PATELLA IS AND WHAT IT DOES.

The canine patella is equivalent to the human knee cap. It is a bony structure that sits in a groove in the femur (thigh bone) on the front of the stifle (knee joint).

Attached to the patella is the quadriceps tendon and the patellar tendon. The quadriceps tendon runs from the patella up to the muscle mass on the front of the thigh and to a lesser extent down over the patella to the patella tendon. The patella tendon runs from the patella down to a protuberance on the front of the tibia.

When the muscles contract, they pull the quadriceps tendon up which pulls the patella up, which, in turn pulls on the tibia via the patella tendon. The result of all this pulling is movement of the knee joint.
1995 STCA Health Survey *

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R = Recessive, D = Dominant, Poly = Polygenic, Und = Undetermined, X-R = Sex-linked recessive

* http://clubs.akc.org/stca/healthsurvey.htm

Control of Canine Genetic Diseases, G.Padgett, DVM (1998)
**BREEDING CONSIDERATIONS**

... Because of the strong genetic relationships animals with this disorder should **NOT** be used for breeding.

They can still be excellent pets - and those that do require surgery will usually lead perfectly normal lives without any restrictions on activity.

[peteducation.com](http://www.peteducation.com)  Race Foster, DVM  Marty Smith, DVM

### 1995 STCA Health Survey *

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ANATOMY
ANATOMY

<----- CRANIAL     CAUDAL ----->

ANGUS
CRUCIATE - from CRUX / CRUSIS "CROSS"
A dog from one of the smaller breeds runs across the yard chasing a tossed ball. In mid-stride, he yelps in pain and pulls his left hind leg off of the ground. After a second, he continues limping on in a three-legged fashion. After ten minutes, the rear leg drops back down to the ground and he uses it normally. This episode occurs maybe once a week. It never really seems to bother him that much – a yelp of pain, a short period of lameness, and in a few minutes he is back to his old self. (continued . . .)
Typically, he is a small or toy breed such as a Lhasa Apso, Pekingese, Pomeranian, Poodle, or Boston Bull. A luxating patella may affect some animals much more severely. They may hold the leg up for several days and show considerable discomfort. Dogs who have a luxating patella on both hind legs may change their entire posture, by dropping their hindquarters and holding the rear legs farther out from the body as they walk. Those most severely affected may not even use their rear legs, walking by balancing themselves on their front legs like a circus act, or holding their hindquarters completely off the ground.
LUXATION: partial dislocation (misalignment)
AKA “SUBLUXATION”
DOG’s RIGHT PATELLA: SEVERELY MISALIGNED “LUXATED”

DOG’s LEFT PATELLA: NORMAL POSITION
DOG’s PATELLA:

NORMAL POSITION

Courtesy of Diana Rosenstein, DVM, MSU
DOG’s PATELLA:
MISALIGNED / “LUXATED”

Courtesy of Diana Rosenstein, DVM, MSU
DOG’s PATELLA:
SEVERELY MISALIGNED
“LUXATED”

www.petplace.com
Which dogs are at risk of having a luxated patella?

Smaller breeds of dogs, especially Miniature and Toy Poodles, have the highest incidence of patella luxation. Genetics can play a role. In certain breeds that have extremely short legs such as the Basset Hound or Dachshund, patellar luxation is thought to be secondary to the abnormal shape of the femur and tibia. The curvatures of the bones in these breeds work in conjunction with the forces of the quadriceps muscles to displace the patella to the inside. IMPORTANT – not all members of these breeds are affected with patellar luxation, only a small portion.
In certain breeds that have extremely short legs... PATELLAR LUXATION is thought to be secondary to the abnormal shape of the femur and tibia. The curvatures of the bones in these breeds work in conjunction with the forces of the quadriceps muscles to displace the patella to the inside.
GRADES of PATELLAR LUXATION:

• [1] INTERMITTENT – asymptomatic or occasional limp; Patella can be manually luxated at full extension of the stifle, but returns to proper position when pressure is released
• [2] FREQUENT – occasional / brief limp; spontaneous resolution; Minimal or infrequent apparent discomfort to dog
• [3] NEAR-PERMANENT - frequent or always limp; avoid jumping on/off things; patella fixed in luxated position or will not return when manually displaced; dog may walk with limb in a semi-flexed position or avoid weight bearing
• [4] PERMANENT - always walk with limb in a semi-flexed position or avoid weight bearing; unable to manually extend limb from flexed position; pain & disability
• [5] vs. “SEVERE GRADE 4”
MEDICAL (NON-SURGICAL) THERAPY?

... has little corrective ability in this disorder and surgery is therefore required and is the treatment of choice.

BUT:
Surgical treatment is NOT necessary in every dog with this condition.
SURGERY for Lux. Patella

Groove at the base of the femur may be surgically deepened to better contain the patella

- Patella may be 'tied down' laterally (on the outside) to prevent it from deviating medially (toward the inside)

- Tibial Tubercle / bony protuberance at the site of the attachment of the quadriceps tendon on the tibia, may be cut off and then re-attached in a more lateral position.

- All of these procedures work well and the type performed depends on the individual case and the Veterinary surgeon

- The dog should respond quickly after surgery and is usually completely recovered within thirty days, using his legs in normal fashion.
Surgical Correction?

What are the risks?
Uncorrected, the patellar ridges will wear, the groove will become even shallower and the dog will become progressively more lame. Arthritis will prematurely affect the joint, causing a permanently swollen knee with poor mobility. Therefore, a good evaluation needs to be done by your veterinarian early in the condition to prevent long-term arthritic crippling.
RISKS OF SURGERY:
- FAILURE / RELAPSE
- MORE SURGERY
- POST-OP INFECTION
- ANESTHESIA DEATH

RISKS OF NOT SURGICALLY CORRECTING LUXATING PATELLA:
- DEGENERATIVE ARTHRITIS
- LAMENESS
- CRUCIATE LIGAMENT INJURY
F - FEMUR
P - PATELLA
T - TIBIA
CCL - CRANIAL CRUCIATE LIGAMENT
RED ARROW - “TIBIAL THRUST” DUE TO UNSTABLE STIFLE (KNEE)
Tear of cranial cruciate ligament produces instability
RISK FACTORS for CRANIAL CRUCIATE LIGAMENT INJURY

- OBESITY
- AGE & DECONDITIONING
- PATELLAR LUXATION
- POOR CONFORMATION (IMPERFECT LEG ANATOMY)
- EXCESSIVE CAUDAL SLOPE OF TIBIAL PLATEAU
- NARROWED PATELLAR NOTCH
- TRAUMA
"FRISBEE CATCH": A SIGNIFICANT RISK OF SERIOUS LEG INJURIES IN DOGS?
WHY “FRISBEE” IS NOT A SPORT FOR SCOTTIES
“INCOMPETENT HANDLING” : A RISK OF LEG INJURIES IN SCOTTIES?

SCOTTIES SHOULD BE CARRIED WITH TWO HANDS ! . . .
MUCH BETTER! - TWO HANDS!
* CCL INJURY

CAUSES:
- Patellar Luxation
- Trauma
- Degenerative Changes
- Hereditary ?(anatomic abnormalities)

SIGNS:
- Limp / Lameness
- Abnormal Gait / Flexed Hindlimb
- Joint Swelling / Tenderness
- Anterior Drawer Sign

BREED PREDILECTION:
- Large size Breeds
- Labrador retriever
- Rottweiler

DIAGNOSIS:
- Clinical Examination
- Observing Gait
- XRAY:
  - Fat Pad
  - Calcified Ends of Ruptured Ligament
  - Arthritis Changes

* CCL – CRANIAL CRUCIATE LIGAMENT
SURGERY for CCL INJURY

[ 1 ] Lateral Fabellar (Extracapsular):

- Heavy suture material (monofilament nylon) is passed from the lateral fabella to the tibial crest and tied in order to eliminate joint instability (drawer movement).
- Scar tissue develops around the stifle joint which helps to stabilize the joint; decreases the range of motion of the joint.

**Diagram Elements:**
- F - FEMUR
- P - PATELLA
- FB - FABELLA
- T - TIBIA
- CCL - CRANIAL CRUCIATE LIGAMENT
- RED ARROW - “TIBIAL THRUST” DUE TO UNSTABLE STIFLE (KNEE)
[ 1 ] Lateral Fabellar (Extracapsular)

Stifle joint (side view) has implanted nylon bands which stabilize the joint. The blue short line represents the cranial cruciate ligament and the red lines represent the nylon bands that are passed around the fabella bone (which sits on the back of the femur bone), and through a hole that has been drilled in the front part of the tibia bone. The nylon bands (red lines) are in the same orientation as the cruciate ligament.
Healing Phases Following Fabellar Band surgery:

- 2 weeks after the surgery, should be touching toes to the ground at a walk
- 8 weeks the lameness should be mild to moderate
- 6 months after the surgery dog should be using the limb well

Success rates:

- ~85% of the cases are significantly improved from their preoperative state
- Extracapsular technique: ~50% of dogs will have some degree of lameness, whether it is mild or intermittent following heavy activity
- ~50% regain normal function of the limb.
- Even though this surgery may not return the limb to perfectly normal function, these dogs usually are greatly improved over their condition prior to surgery.
SURGERY for CCL INJURY


• **TIBIAL THRUST:** When the cruciate ligament is ruptured, the slope of the tibial plateau, along with the forces exerted by the calf and quadriceps muscles cause the femur bone to slide down the top of the tibia bone called the tibial plateau. This in essence causes the tibial plateau to thrust forward with each weight-bearing stride and is called **CRANIAL TIBIAL THRUST**

• Results in excessive wear of the cartilage of the joint. In addition, as the tibia thrusts forward it stretches the tissues which surround the joint, which causes pain.

• Also can tear of one of the cartilage pads in the knee called the MEDICAL MENISCUS. This usually results in a meniscal bucket handle tear or crush injury.

• **TPLO** can eliminate cranial tibial thrust, thus creating a dynamically stable stifles and sound gait.
Healing Phases Following TPLO surgery:

- Convalescence more rapid than other surgical techniques of CCL repair
- Approx. 50% of dogs will start to walk on the limb within 24 hours after surgery
- Within 5 days after surgery most dogs will begin weight-bearing on the operated limb
- By 2 weeks after surgery, a moderate amount of weight-bearing can be expected.
- 2 months after surgery, exercise in the form of leash walks should be gradually increased
- Complete recovery may take 3 to 5 months
- At 4 months after surgery most restrictions of exercise can be lifted. Full working activities (hunting, agility, etc) can begin at 6 months after surgery. Unconstrained activity prior to this time can cause spraining of the soft tissues of the stifle (patellar ligament sprain) resulting in a prolonged recovery
- Yearly radiographs of the stifle should be taken to evaluate the degree of arthritis. The TPLO procedure should minimize the progression of degenerative joint disease
Success of TPLO surgery:

• ~90% of the dogs having the TPLO regain normal or near normal function of the limb (full weight-bearing)
• Remaining 10% of dogs that do not do as well have concurrent arthritis of other joints on the limb or advanced degenerative joint disease; most of these dogs in this group are also helped with the surgery
• Only a small percentage of dogs do not respond well to this type of surgery
• Dogs that have sustained a blowout fracture of the tibial plateau as a complication of falling after surgery tend to not regain as good of function on the limb
• Dogs that have been previously operated using another technique frequently are improved with the TPLO surgery, but the outcome may not be as good, versus a virgin knee that has received the TPLO surgery

D. Degner, DVM, DACVS / vetsurgerycentral.com
Potential Complications of TPLO surgery:

• If activity is unleashed prematurely, straining of the patellar ligament can occur. Rest and anti-inflammatory medication is used to resolve this problem.

• Fracture of the narrow front part of the tibial crest can occur. This is not common, and usually will heal without any surgical intervention. Recovery will be delayed, but the final result still should be very good.

• A blow-out fracture of the tibial plateau has been seen in 3/700 cases at our hospital *. The cause of this is due to the dog falling on the stifle after surgery. Reoperation is performed in these cases.

• Loosening of the screws with shifting of the slope of the plateau may occur if the pet is not restricted during the healing phase. If the plateau has shifted a significant amount reoperation is performed.

• Arthritis usually is present at the time of surgery. Surgery can help to minimize the progression of this. Anti-inflammatory medications are useful to ameliorate a flare-up of arthritis.

• Tearing of the meniscus (cartilage pad in the knee) may occur following TPLO surgery and additional surgery would be needed. This complication occurs less frequently following the TPLO versus when other surgical techniques used to stabilize the stifle joint.

* D. Degner, DVM, DACVS / vetsurgerycentral.com
ANGUS aka “FROGGY”

SCOTTIES WHO ROUTINELY ASSUME “FROGGY” POSTURE OF HIND LIMBS SUGGESTS STABLE / HEALTHY HIPS & STIFLES (KNEES)
LOLA

SCOTTIES WHO SEEM COMFORTABLE ON THEIR BACKS, & SEEM FLEXIBLE & AGILE ARE OTHER REASSURING SIGNS OF HEALTHY SPINE & EXTREMITIES
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Orthopedic Articles

- Tibial plateau leveling osteotomy for cruciate repair
- Dynamic tibial plateau leveling procedure for immature dogs
- Extra-capsular cruciate repair (nylon band technique)
- Patellar luxation
  - Arthroscopy - general information
  - Arthroscopy of the elbow
  - Arthroscopy of the stifle
  - Arthroscopy of the shoulder
- Triple pelvic osteotomy
- Total hip replacement
- Femoral head and neck excision
- PennHip - early detection of hip dysplasia
- Hip dysplasia
- Juvenile Pubic symphysisodesis
- Elbow dysplasia
- Legg-Calve-Perthes disease
- Osteochondritis dissecans of the shoulder (OCD)
- Arthrodesis
- Hypertrophic osteodystrophy
“THANK YOU”

Marcia Dawson, DVM

Diana Rosenstein, DVM (MSU Dept. Radiology.)

Daniel A. Degner, DVM, DACVS

Drs. Foster, Smith, Newman, Vidt, et.al.

STCC / Fellow Members

Nera, Angus, Lola
“ECONOMY”

OF

SCOTTIES :
GROOMING: $ (BUT WORTH IT !)
“DOG TOYS” DESTROYED IN MINUTES BY SCOTTIE . . .
“PREMIUM”

DOG FOOD & TREATS

$ $$ $$
REPAIR
OF
WOODWORK,
FURNITURE,

etc.

$ $ $ $ $.
FAITHFUL GREETING

AT THE END

OF A

LONG, DIFFICULT

DAY . . . . .
PRICELESS !
MY GOAL IN LIFE IS TO BE AS GOOD OF A PERSON AS MY DOG ALREADY THINKS I AM

-Anonymous-