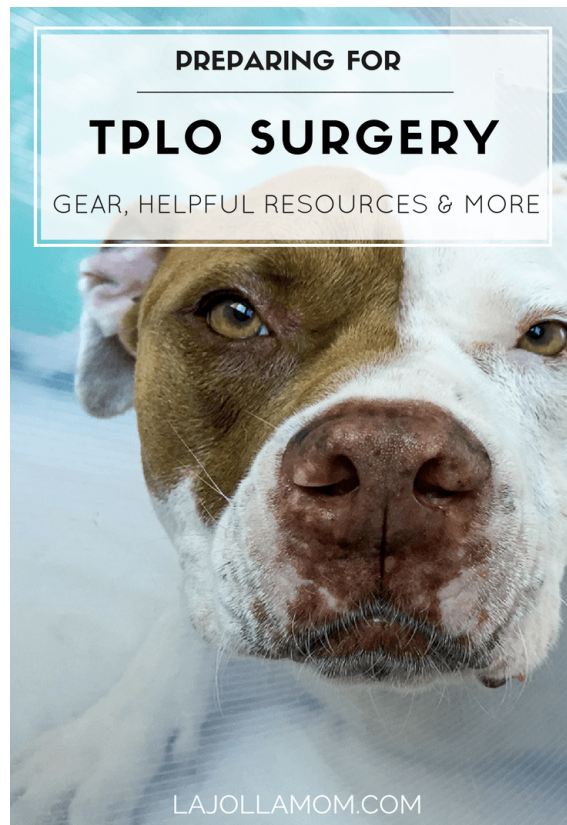
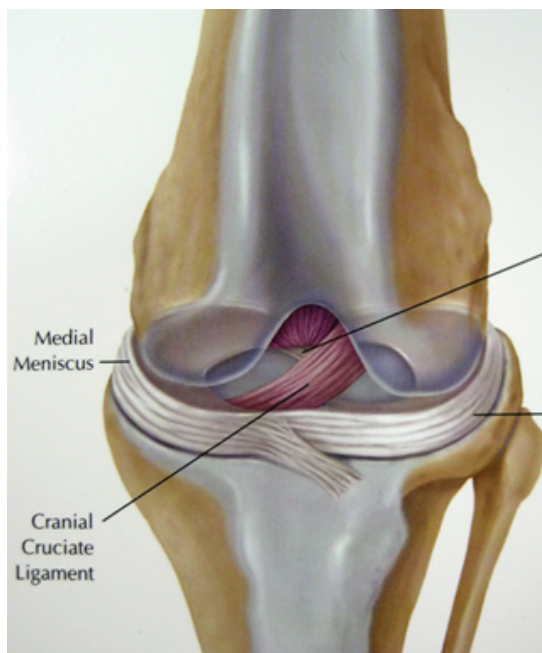


# TPLO (Tibial Plateau Leveling Osteotomy) HOME RECOVERY PROGRAM



## The Cranial Cruciate Ligament (CCL)

There are a number of ligaments in a dog's stifle (knee) that contribute to joint stability. The CCL is the primary ligament responsible for limiting "cranial drawer" motion (excessive forward & backward sliding of the femur on the tibia bone). When a dog has a partial tear or ruptures this ligament the joint instability causes inflammation & pain which is why your dog favors the leg. OsteoArthritis (OA), degenerative joint disease or degenerative arthritis, is a form of arthritis caused by inflammation, breakdown & the eventual loss of cartilage in the joints. There are many factors that can lead to the progression of OA; failure to stabilize this joint will accelerate this process.



**Normal CCL**

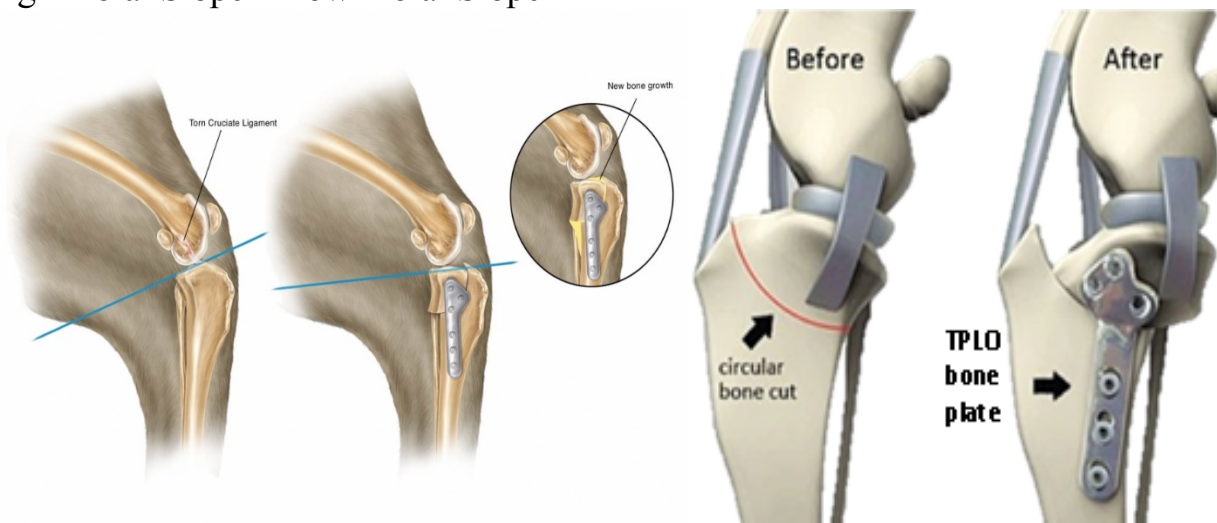


**Injured CCL**

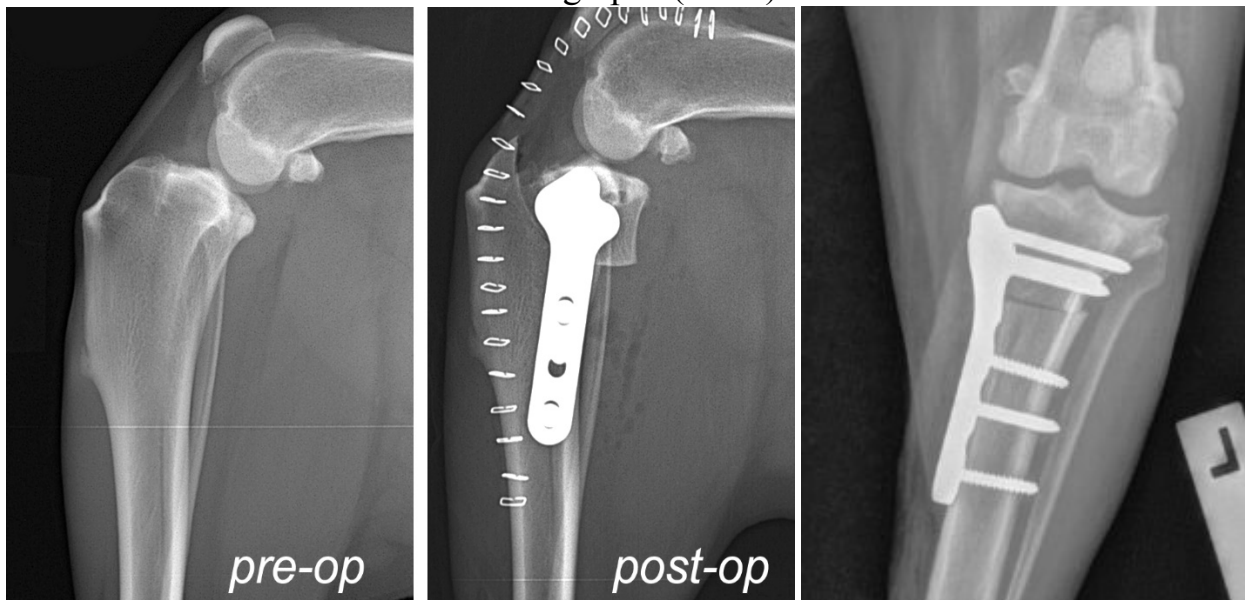
## What is a TPLO?

The TPLO procedure neutralizes the effect of this drawer motion. A circular cut is made in the top of the tibia & the smaller portion of bone is rotated to reduce the slope of the tibia. Dogs in general have a high tibial slope compare to humans, which make them more prone to injury their CCL. A special surgical grade stainless steel plate with locking screws are used to hold the two bone segments together. Over time (~12 weeks) the bone segments will heal together to provide lifelong stability.

High Tibial Slope – Low Tibial Slope



Radiographs (Stifle)



# **TPLO**

## **Home Preparation for your Pet's Home Recovery**

### **HOME PREPARATION**

Prior to your pet coming home, you should determine where you are going to confine your dog during this post-operative period. Making your dog as comfortable as possible is as important as having a good rehabilitation/recovery plan. As your dog's mobility is to be restricted, we recommend that you utilize the following:

- A dog crate that is large enough that he/she can stand up & turn around

(for only pets that are NOT self-destructive or anxious being kennel for long period of time).

- A gated off area such as the kitchen (for rooms without furniture for patient to jump on)
- Confinement to a room (for rooms without furniture for patient to jump on)

Surfaces such as hardwood floors, tile, linoleum, etc. can be very slippery. We suggest that you place some throw rugs with rubber backing or yoga mats on these surfaces to make it easier for your dog to walk around.

### **HOUSE RULES**

- No jumping at all! No jumping on/off the bed/couch/furniture/windows! No jumping on you! Overextension of the knee could compromise the repair of your dog's leg & delay the healing time.

- Stairs: For the first 2 – 4 weeks following surgery, stairs should be limited to a short flight to get in or out of the house. Your pet needs to be on a short leash & slowly guided up & down 2 – 3 stairs (use the sling under their belly for support). If you have stairs in your home, limit your dog's access to them with something like a baby gate to prevent unsupervised use of stairs. Longer flights of stairs should NOT be used for strength training but are allowed with supervision after the 4 weeks post-surgery as long as your dog is consistently using their leg & is NOT allowed to run or jump up the stairs.

- No active play! Refrain from active play with your dog & do not allow him/her to play with other dogs until your veterinarian tells you otherwise (likely after the 8 week post-operative x-rays to confirm bone healing).

## **TPLO: Home Recovery Program**

Uncontrolled pain can slow down the healing process & delay your pet’s recovery. We have supplied medications to alleviate this post-surgical pain & inflammation. It is important that you give all medications as directed so that your pet is most comfortable. This does not mean that they should have free-rein because they, “Feel good”. Your pet still needs to be restricted to avoid compromising the orthopedic surgery which may lead to prolonged recovery & potentially additional surgeries plus cost. After the surgery your dog is going to limp on the surgically repaired leg for a period of time. This is because your dog has lost muscle & the leg is weaker & may get sore from building muscle as you progress through your pet’s at home recovery program. Your dog should be placing some weight on the surgical leg (even just touching toes to the floor) within 7 days from the date of the orthopedic surgery. Over the course of the next few weeks the degree of limping should decrease. If your pet is too active during recovery, his/her limp may become more severe. In this case, you should apply ice 3 times a day, allow 24 hours of rest & give any prescribed pain medication.

*Call your veterinarian if there is no improvement after the 24-hour period.*

- No licking! Allowing your dog to lick at the incision will compromise the healing process. Licking introduces bacteria to the area & in severe cases, can cause infection to NOT only the incision but to the bone itself plus TPLO implants itself. The infected TPLO implant may need to be removed once the TPLO osteotomy site has healed completely. This type of complication can delay the healing significantly & potentially do permanent damage to the leg. Infection due to licking is the most common complication following TPLO surgery & is totally preventable. Close supervision is mandatory. E-collar always on.

### Monitor Your Pet’s Incision Site

NORMAL	ABNORMAL
1 <sup>st</sup> week minimal swelling around incision	Swelling around incision last >1 week
Leg Bruising	Incision site non-clear (colored) discharge
1 <sup>st</sup> few days – incision site may have clear to blood tinge discharge	Incision site – large amount of bleeding or discharge
Incision site & TPLO leg – mild discomfort	Incision site & TPLO – discomfort after pain & anti-inflammatory Rx(s)
TPLO leg – warm to the touch	TPLO leg – hot to the touch & painful when touch, pet vocalize/cries

\*\*\*NOTE\*\*\* If any of the abnormal signs appear, contact your veterinarian The incision should be healed 10 – 14 days after the surgery. The sutures will need to be removed at this time. Please make an appointment so that we can assess the incision site & your dog’s recovery/progress.

## **TPLO: WEEK by WEEK Recovery Program**

The weekly recovery program described in the following pages is invaluable for ensuring your pet's recovery. This program has been designed to:

- Accelerate your pet's recovery to full function of the leg
- Reduce pain & muscle atrophy (muscle loss & weakness)
- Strengthen muscles to help stabilize & support the joint
- Enhance the healing of the affected bone & tissue due to increased blood flow
- Restore normal joint range of motion
- Decrease the risk for future injury
- Recognize when veterinarian intervention is required

The physical therapy exercises should be started slowly & cautiously. It is best to time these ~30 minutes after you administer your dog's pain medications so that he/she is most comfortable. It is unfair to ask a dog to exercise when it hurts to do so. Watch for signs of discomfort such as struggling or significant resistance to the exercises. Signs of pain can include: decreased appetite, excessive panting, vocalization, aggression or decreased interaction with family members, altered posture (hunched posture), restlessness, flinching when touched, elevated heart rate & respiratory rate &/or dilated pupils. If your dog is stiff & reluctant to allow further manipulation you may need to reduce the amount of physical activity & /or request additional pain medications from your primary veterinarian. Your dog may be tentative at first but his/her comfort level will increase as you progress.

Please remember: Adequate rest & physical therapy are the keys to obtaining & maintaining normal limb function. If your dog does not appear to be making positive progress, has any complications or you have any questions, please contact us anytime.

\*\*\*NOTE\*\*\* It is extremely important to follow this program guideline as closely as possible to ensure proper recovery. The exercises described in this package should be performed in the order they are listed.

*This booklet serves as a guide during the important post-operative healing period following your pet's TPLO surgery. Included in this booklet is a week-by-week recovery schedule along with visual aids & descriptions to help guide you through the various exercises. Please follow this program.*

## **Physical Rehabilitation Plan: Day 0 – 14**

The first 24 – 48 hours following your dog’s surgery he/she may have a bandage on the affected leg. This bandage has been applied to protect the incision as the skin is sealing & to provide some compression to minimize swelling. Manual therapy can begin as soon as the bandage is removed; 2 to 3 days following surgery. The following routine should be done daily until your pet is consistently using their leg & has full range of motion in the knee (when you can bend & straighten the surgical leg the same amount as the non-surgical leg). At that point, it is still recommended once to twice a week as he/she will be building muscle & compensating for the surgical leg (The other limbs & lower back will often have muscle tension & discomfort).

### **MASSAGE & PASSIVE RANGE OF MOTION (PROM)**

Massaging your dog’s leg is important for relaxing the muscles prior to performing the exercises for rehabilitation. Lay your pet on his/her side on a comfortable surface with the surgical limb up. Target the muscles above & below the joint. Start the massage by pressing down on the muscles with the heel of your palm. You should not move your hand over the skin, but instead press down hard enough to move the skin over the tissues below. Using the heel of your palm, it’s unlikely that you will press too hard & possibly injure healing tissue. If your dog shows no signs of discomfort, go back & massage the same areas with the balls of your fingers, where your fingerprints are, not the tips. This provides a deeper massage. Then run the flats of your hand over the whole massaged area. Finally, flex & extend the affected limb several times, gently, until a little resistance is felt. Support the joint while doing this to prevent any twisting of the limb. If you have time, your dog will also greatly benefit from this therapy on the other limbs as they have been compensating for the injured leg. It is also a great way to practice your technique on a “healthy” limb to build your confidence

*Frequency & Duration: 3 TIMES DAILY for 10 minutes per session*

## **CONTROLLED LEASH WALKS**

This exercise requires your dog to be on a short lead very close to your body so that you have complete control of him/her. Body harness or gentle leaders are good options. Leash walks must be done slowly & for short periods of time to build up strength in the leg. For the first few days any walks outside should be for urination or defecation only. By the end of the first week, your dog should be able to walk for ~5 minutes per walk. The slower you walk your dog the more inclined he/she will be to place weight on the leg. Make sure to support the hind end under the belly with a sling if needed. This is particularly important on slippery surfaces. Your dog will benefit more from several short walks in one day rather than a single long walk. If your dog has been sent home with a bandage, please ensure the bandage does not get wet when he/she is outside. If this happens, it needs to be removed immediately. Placing a heavy plastic bag or dog bootie on to go outside should eliminate this possibility. Benefits includes the following:

- Keeping the muscles strong & lubricating the joints
- Encouraging use of the affected limb
- Decreasing pain
- Positively rewarding your dog emotionally

*Frequency & Duration: 3 TIMES DAILY for 5 minutes per walk*

## **ICE THERAPY**

Start on DAY 1 & Day 2. After completing the above exercises, it is especially important to apply cold therapy to the affected knee to reduce pain & inflammation. You can use gel ice packs from the drugstore, frozen bags of popcorn kernels or bags of crushed ice. Wrap the ice material in a towel before applying. Place the ice on both the inside & outside of the knee.

*Frequency & Duration: after exercise for 10 – 15 minutes*

## **HEAT THERAPY**

By the 3rd day you can begin applying heat to the affected leg at the very start of your therapy session prior to massaging. Heat will draw blood to the area to enhance circulation at the surgical site, which aids the healing process. A variety of products are available such as “Magic Bags” or other heat products from the drugstore. Do not use topical products such as gels or creams. Check the temperature before applying heat to the area & make sure that you use a light towel in-between the product & the skin. Do not apply heat to the joint if it is inflamed (swollen) & warm to the touch.

*Frequency & Duration: prior to massage for 5 – 10 minutes*



## **ACTIVITIES to** **BUILD STRENGTH, FUNCTION, MUSCLE MASS & BODY AWARENESS**

The following exercises will be incorporated into the next 12 weeks of recovery. The intent of this program is to gradually increase strength, balance, & body awareness so that your pet can return to normal activity. All of these exercises are demonstrated on youtube.com webpage. These two pages provide detailed descriptions of the exercises. Please follow the schedule indicated on the table on the following page.

### **CONTROLLED LEASH WALKS**

Walks should be on a 6' lead with the dog by your side. Up until this point, you have been walking up to 5 minutes per walk 3 – 4 times per day. From this point on, you can add 3 – 5 minutes per walk per week. This activity should only be increased if your pet is consistently using his/her leg at a walk. You can incorporate activities such as: Figure 8 patterns, walking up and down curbs in a S-pattern, gentle inclines (hills), stepping over obstacles/through long grass or snow, and short trotting intervals (10 steps) into these walks to make them more challenging and to increase muscle mass and strength.

### **WEIGHT SHIFTING EXERCISE**

Have your pet stand squarely on a non-slip surface & gently nudge the hind end from side to side for 10 repetitions. This will help with balance & core strength & will lay the groundwork for further core conditioning. For a further challenge, have your pet stand with the front legs elevated (first on a stable surface like some stairs & then on an unstable one like a cushion, air mattress or FitPAWS equipment). This will force more weight onto the hind end.

### **EXERCISES TO INCREASE BODY AWARENESS**

These exercises have you walking your dog on a leash in a “figure 8” pattern &/or through a series of obstacles in a “weave” pattern. This exercise helps to encourage the use of the leg & increases proprioception (Proprioception is the knowledge of where all one's body parts are in space). Another great exercise to help with proprioception is walking slowly through the rungs of a ladder laid on the ground. As your pet walks slowly through this obstacle, they must carefully think about where they are putting their feet. Drop treats in between the rungs to make this an extra fun game.

### **COOKIE STRETCHES**

Have your pet stand squarely on a non-slip surface & guide his nose to each hip, up, & then down for one repetition. Do this 5 times working up to 10 repetitions. Once he is comfortable with this exercise, you can place him on an unstable surface such as a couch cushion (on the floor), air mattress or FitPAWS giant disc/balance pad/peanut (available for purchase) to further challenge him. This exercise will help with spinal mobility & core strengthening.

## **SIT-to-STAND**

This exercise is a “Doggy Squat”. Have your pet sit squarely & then stand for 5-10 repetitions. They have a tendency to cheat & use their nonsurgical leg to push up so it is often helpful to have their surgical leg against a wall as you perform this exercise. This can also be incorporated into daily walks or at feeding time, you can use part of his kibble to entice him to do this exercise.

## **THREE LEGGED STANDING**

Have your pet stand squarely on a non-slip surface & then gently lift one leg off of the ground & hold for 5 – 10 seconds. Alternate with all but the surgical limb. Once your pet becomes good at this exercise, you can try two legged standing by lifting diagonal legs (left front & right hind) & vice versa.

## **WADING IN WATER**

Once your pet has their sutures removed, they are able to walk in water that is up to hip height. The buoyancy of the water will displace some of your pet’s weight & take some pressure off of the joints. There is also resistance in the water so they are also working on strength & flexibility. **IMPORTANT:** If you pet will not walk in a controlled manner & likes to leap in water then this is not a good activity until after the 8-week x-ray is assessed by your Veterinarian.

## **WALKING IN DEEP SNOW OR IN LONG GRASS**

in deep snow & in longer grass will make your pet pick their legs up higher which will build strength. This should only be done if you have your dog on a short leash & have control of them.

## **SWIMMING**

Swimming is allowed after the 8 week x-rays have been assessed & you have the go ahead from your Veterinarian. The uncontrolled kicking action can be harmful in the early stages of your pet’s recovery so it is important to be aware of this. Swimming is a great cardiovascular workout & is great for weight loss.

## **TUG**

Tug games are a great way to burn energy & to work on strength. The best tug toys have a bungee cord in the tug rope to prevent jarring to your dog’s neck or your shoulders when the taut rope suddenly stops the dog.

*Other optional & beneficial physical rehabilitation therapy/exercises including laser therapy & water treadmill can be performed at*

*UCDavis Small Animal Surgery/Physical Rehabilitation Service*

*VCA Sacramento Referral*

*Sierra Ranch Veterinary Clinic & Physical Rehabilitation Center*

Stage of Recovery	Exercise/Manual Therapy	Frequency	Time/Repetitions
0 – 14 days post op	Follow the manual therapy routine listed on pages 3 & 4	Daily	2 – 3 times per day for the first week or until range of motion is normal compared to the opposite limb
<b>AT THIS TIME YOU WILL NEED TO MAKE AN APPOINTMENT TO HAVE THE SUTURES REMOVED. WE WILL ALSO ASSESS YOUR PET'S PROGRESS AND MAKE ADJUSTMENTS TO YOUR REHABILITATION PROGRAM AS NEEDED</b>			
Weeks 3 & 4 post op (If patient is consistently using the leg)	Manual therapy as above	1 – 2 times per week	~ 30 minutes
	Ice Therapy	As needed (after exercise or if your pet overdoes it and is sore)	15 minutes
	Controlled Leash Walks	3 times per day	10 minutes
	Weight Shifting	Once a day	2 minutes
	Figure 8/weaves/ladder	Once a day	2 minutes
	Cookie Stretches	Once a day	5 repetitions working up to 10
	Sit-to-stand	Twice a day	5 repetitions working up to 10
	Three legged standing	Twice a day	2 repetitions working up to 4
Weeks 5 – 8 post op	Manual therapy as above	1 – 2 times per week	~ 30 minutes
	Ice Therapy	As needed (after exercise or if your pet overdoes it and is sore)	15 minutes
	Controlled Leash Walks. Add in short trot intervals and hills into each walk to increase fitness	3 times per day	Add 3 – 5 minutes per walk per week to a maximum of 20 minutes per walk or 60 minutes total per day
	Walking in water/snow/long grass	3 times per week	Incorporate into total walk time (up to 60 minutes for the day)
	Weight Shifting: add unstable footing (air mattress, couch cushion) for further challenge	1 – 2 times per day	4 minutes, add 1 minute per session per week
	Cookie Stretches	1 – 2 times per day	Add 3 - 5 repetitions per session per week up to 15 reps/session
	Sit-to-stand	Twice a day	Add 3 - 5 repetitions per session per week up to 15 reps/session
	Two legged standing	Twice a day	30 seconds each side
<b>AT THIS TIME YOU WILL NEED TO MAKE AN APPOINTMENT FOR A FOLLOW UP X-RAY TO ASSESS BONE HEALING. YOUR VETERINARIAN WILL INFORM YOU IF YOU ARE OKAY TO PROGRESS TO THE FOLLOWING ACTIVITIES:</b>			
Weeks 8 – 12 post op	Activities can be continued as above with the addition of any of the following		
	Off leash activity	Daily	20 minutes working up TO 60 minutes
	Tug	Daily	5 minutes
	Swimming	Daily	5 minutes working up to 20 minutes over several weeks

## **COMPLICATIONS**

As with any surgical procedure, complications can occur. Unlike human patients who can use a sling or crutches, our patients do not know enough to stay off a healing limb so restricted activity is a major responsibility of the pet owner. Failure to follow these instructions carefully can lead to delayed healing or even failure of the TPLO implant. Additional surgery & expense will apply. The most common complication is delayed healing, where, despite our best efforts to stabilize the joint, individual patients respond slower than others.

Lastly, although this surgery has a ~85-90% percent success rate. Fortunately, most will have no discomfort & will not need additional surgery. If you have any questions, please feel free to ask your veterinarian. If your pet is not using the leg by week 3 or if your pet starts using the leg & then stops using the leg or stops improving week by week or worsens week by week, please call your primary veterinarian to set up a recheck.

## **AFTER 10-12 WEEKS**

By now, your dog's repaired tibia should be healed completely as long as there have been no post-operative complications. Although the bone may have healed, there is still plenty of conditioning required for the muscles & tissues that support the knee joint. As a rule, it takes 2 – 4 times as long to build muscle as it does to lose it. This means that for every 1 week of inactivity leading to muscle atrophy, 2 – 4 weeks are needed to rebuild that muscle mass. It may take 6 months before your dog's hind legs have equal muscling. Studies show that there is a 50-60% chance that your dog will injure the cranial cruciate ligament in the OTHER leg. This is why it is so important to keep your dog lean & active for life. If you have any questions regarding your dog's level of fitness at this time, please discuss this with your primary orthopedic veterinarian.

# **ADDITIONAL RECOMMENDATIONS FOR LONG-TERM JOINT HEALTH & QUALITY OF LIFE**

## 1. WEIGHT MANAGEMENT (Diet & Exercise)

The number one way that you can extend the lifespan & quality of your pet's life is by maintaining a lean & fit body condition. Studies show that dogs that are maintained at an ideal weight for them will likely live 15% longer than dogs that are overfed/overweight. This translates to 2 years longer in a large size dogs or 4 years in a small size dog. We use a body condition scoring (BCS) system that scores your pet out of 9 points where 5 out of 9 is ideal. If your dog has a BCS above 6, it is strongly recommended that you feed your dog a weight management diet. Increased body mass significantly increases your dog's risk of developing osteoarthritis. Routine daily walks at a leisure to light jog pace is ideal.

## 2. JOINT HEALTH

We have stabilized your dog's stifle (knee) with this surgery but with any injury to a joint, there is an increased chance of developing osteoarthritis. Osteoarthritis develops over time with inflammation in joints & leads to the formation of osteophytes (bone spurs) around the joint, which can cause pain & inflammation. There are a couple of ways to supplement your dog to provide the "building blocks" for preserving cartilage & increasing joint lubrication, shock absorption & mobility:

### a. Disease Modifying Osteoarthritis Drug/Supplement

ADEQUAN (polysulfated glycosaminoglycan) is a FDA-approved injectable joint supplement to help control osteoarthritis & is administered as a series of subcutaneous injections (under the skin). The protocol is one injection weekly for 6 weeks & then once a month for maintenance.

### b. Oral Joint Supplements

"Nutraceuticals" given orally as a tablet or powder on their food. There are many choices of joint supplements on the market. We recommend one that is formulated for dogs for best absorption, effect & palatability. Dasuquin Advanced.

### c. Joint Mobility Prescription Diets

Royal Canin (Mobility Support JS)

Purina (JM – Joint Mobility + Metabolic)

Science Diet/Hill's (J/D or Metabolic/Mobility)

We recommend a food that is specifically formulated to maintain joint health. These diet options have put significant research into their joint mobility diets & are highly recommended by our Veterinary team.

These diets have moderate protein to maintain lean body mass, high levels of omega 3 fatty acids, vitamins & natural sources of Glucosamine & Chondroitin.

Note: If your dog has a Body Condition Score of 7/9 or higher, we recommend a weight management diet to reduce your pet's weight first & then switch to a joint mobility diet.

### 3. OMEGA 3 FATTY ACIDS

Research is showing that omega-3 fatty acids, especially EPA, may be helpful in reducing the inflammation associated with arthritis. You may supplement these separately or choose one of the above joint mobility diets which have superior levels.

### 4. LIFE-LONG PHYSICAL FITNESS

Physical activity is important for your dog's overall health & wellbeing. Dogs with regular physical activity live longer, healthier lives & have less behavior problems.

## **SPECIAL CASES**

We perform the TPLO surgery on a variety of dogs at different life stages. For most young healthy dogs, this program will be sufficient to get them back to the activity level they were at prior to their injury & surgery.

Others may have other physical challenges & pre-existing conditions to deal with as they recover such as:

- Back pain
- Bilateral knee surgeries
- Chronic pain & muscle weakness
- Hip dysplasia
- Muscle pain
- Obesity (BCS >7/9)
- Osteoarthritis

If you would like assistance with your pet's exercise recovery, please let your veterinary team know so that we can provide a referral to a local veterinary physical rehabilitation center.

If you have any questions, please feel free to ask your veterinarian &/or veterinary surgeon.

TREAT Veterinary Surgery Service

Dr. Le-Nguyen, DVM, GPCert Canine/Feline Surgery \*2024

(Practice Limited to Surgery)

(916) 230-8103

TreatVeterinarySurgeryService@gmail.com

TreatVeterinarySurgeryService.com