

**Case Study 1: Harley – Urinary incontinence secondary to iliopsoas injury
Dr. Shantel Julius, DVM**

History of Case

Name: Harley

Age: 1 yr 4 mo **DOB:** 05-06-2016

Breed: Spring Spaniel

Sex: Female **Altered:** Spayed

Dog's lifestyle/occupation: Active in agility and obedience; trains in formal classes 3 days a week. Owner believes Harley is jumping full height, but is unsure what height. Harley performs full size agility contacts. Harley also runs in a large yard. Loves to run a circle in deep dirt (dog has made a 'track' in dirt) several times per day.

Brief history of dog's family history: Owner has owned Harley since she was a puppy.

Brief history of problem in which dog is referred for: Harley presented to Oak Grove Animal Hospital (OGAH) on 06-22-2017 for urinary incontinence post-exercise. Owner noted that signs began a few months prior to this visit. Harley was seen at another DVM 6 weeks prior to initial consult, and a urinalysis was normal. Harley had a 4Dx Plus in January 2017 (per owner), and it was negative. Owner thought incontinence may be correlated with BioSpot application and Sentinel administration. At that time, it was recommended Harley start on Proin (phenylpropanolamine) for incontinence. Owner declined, and opted to monitor. Signs did not improve. Owner notes that Harley will play fetch in the yard for 5-10 minutes, and she will breath abnormal for about an hour afterward. Owner also noted that Harley will leak urine for hours after agility, running in the yard, playing fetch, or any other activity. The leaking will occur while Harley is walking, sleeping, and with or without excitement. Owner has been giving an over the counter bladder supplement – unknown what it is.

Interventions:

None prior to appointment

Referring veterinarian's diagnosis:

Urinary incontinence; however not a rDVM, owner came to OGAH on her own for a second opinion.

Test results:

None available

Surgery:

None

Past medical history:

None pertinent, other than above.



Evaluation

Thursday, June 22nd, 2017 – Initial Exam/Consult

Observation: Dog is BAR, appears comfortable from distance.

Gait Assessment:

- Walk: No lameness noted
- Trot: No lameness noted

PROM – affected joints with a comparison to uninvolved joints:

No pain on joint palpation; hip extension good bilaterally; decreased abduction of bilateral hips

Neurological testing: No abnormalities noted

Pain Assessment (0-10) (using pain assessment scale from,

Matthews, K.A., Pain assessment and general approach to management, Management of Pain, The Veterinary Clinics of North America, Small Animal Practice, July 2000, p. 729-755): 3/10



Assessment:

- Problems:
 - Urinary incontinence with exercise
 - Pain on palpation of right iliopsoas muscle
 - Decreased abduction of hips
 - Weak right hind
 - Weak core strength
- Goals:
 - Return to agility and sports with comfort and increased strength
 - Avoid medical management for incontinence by strengthening core and healing iliopsoas injury on right hind

Treatment Plan:

- Recommendations:
 - Complete activity restriction for 2 weeks – no stairs, jumping, climbing, leash to eliminate only
 - Recheck in 2 weeks
- Home exercises:
 - Ice right iliopsoas muscle for 10 mins every 12 hours for 7 days.
 - Balance exercises of lifting opposite front and back limbs until sinks on hind limb; repeat 3x, do once daily. For right hind, activate right lumbar first.
- Medical Management:
 - Rx: Carprofen 75 mg – ½ tab PO q12hrsx7d

Actual History of Treatment

Thursday, June 22nd, 2017 – 1st Visit

- S: Harley is BAR, seems comfortable from a distance
- O:
 - Treatments: Rx: Carprofen 75 mg – ½ tab PO q12hrsx7d
 - Owner education: Discussed activity restriction in depth with owner. No training classes. Recommend brain games to tire Harley
 - Home exercise program:
 - Complete activity restriction for 2 weeks – no stairs, jumping, climbing, leash to eliminate only
 - Ice right iliopsoas muscle for 10 mins every 12 hours for 7 days
 - Balance exercises of lifting opposite front and back limbs until sinks on hind limb; repeat 3x, do once daily. For right hind, activate right lumbar first.
 - Program within hospital: None
 - Measurable outcomes:
 - Weight: 48.5 lbs
 - BCS: 3.5/5
 - Observation of gait pattern, function, etc: No obvious lameness at this time, however dog does become incontinent with increased activity
- Assessment:
 - Progress:
 - None at this time
 - Deficits remaining from initial plan:
 - No changes at this time.
 - Remaining problems and goals:
 - Goals: Return to function, decrease pain, increase strength, decrease/control incontinence.
 - Problems:
 - Urinary incontinence with exercise
 - Pain on palpation of right iliopsoas muscle
 - Decreased abduction of hips
 - Weak right hind
 - Weak core strength
- Plan:
 - Recheck in 2 weeks to re-evaluate plan



Tuesday, July 11th, 2017 – 2nd Visit – however Harley saw another DVM

- Harley's owner was told to return to activity, and stop exercises. DVM prescribed Proin.

Monday, August 21st, 2017 – 3rd Visit

- S: Harley is BAR. Owner reports that after the last visit with other DVM, Harley was extremely incontinent for 2 days. Owner started Proin, but has been out for a week. Owner continued exercises, and somewhat restricted Harley. Owner does allow Harley to play ball, with incontinence occurring after playing ball. Harley is not back to full agility yet.
- O:
 - Treatments: Welactin liquid – give 2,655 mg EPA+DHA per day

- Owner education: Discussed activity restriction in depth with owner. No training classes. Recommend brain games to tire Harley. Started more activities for Harley for strengthening purposes. Discussed longevity of therapy.
- Home exercise program:



- Controlled leash walk for 20 minutes daily – increasing 10 mins per week
- Kick back stand – controlled sit with a kick back stand. To train this, have Harley sit with front feet on something (a book works well). Gently place hand on chest and ask for a stand. She should stand by keeping front feet still, and lifting back end. Repeat 5 times 4-6 days/week
- Stand with forelimbs elevated 2 feet or so. Keep back legs square and weight shifted to back legs by having Harley tuck her head to her chest very slightly. Have her hold this position for 30 seconds. Perform one time – 4-6 days/week. Increase duration every week by 10 seconds until she can hold it for 2 mins.
- Nose stretch – guide Harley’s nose to her hip, keeping forelimbs as even as possible and back limbs square. Do other side. Then go to the other side’s foot, then do other side. Repeat a total of 3 times. No need to hold position for longer than giving a treat or guiding. Perform 4-6 days/week.
- Diagonal leg lifts – lifting opposite limbs (ie left front and right hind) for 15-20 secs, then switch to right front and left hind. When having her weight bear on right hind, activate lumbar and gluteal muscles by gently scratching area for 5 secs once. Make sure when lifting limbs not to lift too high or out away from body. Perform 3 times on each side 4-6 days/week.
- Side steps – standing beside Harley’s shoulder, ask her to step sideways for 7-10 steps. Do both directions 3 times. Perform 4-6 days/week.
- Thigh master – with Harley laying with her hip on the floor, and sitting slightly on sternum, guide Harley to get treat under her ‘up’ back leg, lifting the thigh up. Hold position for 10 secs, and release. Repeat 3 times. Then switch sides.
- Exercises can be divided into doing on different days. Not all exercises need to be repeated on the same day.
- In 2 weeks, begin jump and tunnel sequencing.

- Program within hospital: None

- Measurable outcomes:

- Weight: 47.9 lbs
- BCS: 3.5/5
- Goniometry:
 - LH: Hock 30/170; Stifle 35/160; Hip 60/155
 - RH: Hock 35/170; Stifle 35/160; Hip 58/150
- Thigh circumference:
 - LH thigh circumference: 33 cm
 - RH thigh circumference: 32.5 cm
- Radiographs: Right stifle (unable to obtain VD hips and stifles) – no abnormalities. Dr. Steve Levine, DVM, MS, DACVS



- Observation of gait pattern, function, etc: No obvious lameness at this time, however mild toe in on RH at a trot; no pain response on palpation of inner right thigh; hip extension

good; core strength mild to moderate – improved from June; no pain on lumbar palpation; sinks on RH when LH and RF picked up, but much less than previously; responds to stimulation of right lumbar muscle, then sinks less; mild kyphosis at L3-5

- Assessment:
 - Progress:
 - Improvement in incontinence
 - Improvement in pain
 - Deficits remaining from initial plan:
 - Weak RH and core
 - Incontinence still present.
 - Remaining problems and goals:
 - Goals: Return to function, increase strength, decrease/control incontinence
 - Problems:
 - Urinary incontinence with exercise
 - Decreased abduction of hips
 - Weak right hind
 - Weak core strength
 - Decreased hip extension and flexion bilateral
 - Decreased hock flexion and extension bilateral
 - Decreased stifle flexion bilateral
 - Mild kyphosis
- Plan:
 - Recheck in 3 weeks to re-evaluate plan

Monday, September 11th, 2017 – 4th Visit

- S: Harley is BAR. Owner reports that Harley is doing well, however she still gets incontinent after certain activities, most noted on weekends. However, on weekends, owner admits to letting Harley run loose in the yard, doing laps through a thick, high dirt track. The nose stretch to the right is harder for Harley; she can't hold it as long as she can on the left side. The diagonal leg lifts are also more difficult. Harley did go swimming for about 20 mins, and did not seem sore or incontinent after. Walks are still at 20 mins. Owner thinks she is doing the thigh master incorrectly. Owner has not begun any sequencing, jumps, or tunnel work. Owner is feeding a dry kibble with additional chicken and vegetables.
- O:
 - Treatments: None
 - Owner education: No running in deep or loose footing/dirt. Ideally, avoid running at all at this point. That will delay healing. Leash only while outside. Owner states this is difficult for her to do. Recommend stop the added vegetables. Recommend Purina Pro Plan for active dogs, which provides a better protein:fat content.
 - Home exercise program:
 - Controlled leash walk for 20 minutes 2-4 times per week; alternate with 20 mins of swimming if able.
 - Kick back stand – controlled sit with a kick back stand. To train this, have Harley sit with front feet on something (a book works well). Gently place hand on chest and ask for a stand. She should stand by keeping front feet still, and lifting back end. Repeat 5 times 4-6 days/week

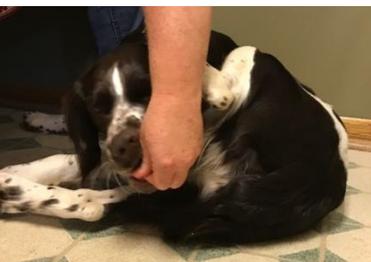


- Stand with forelimbs elevated 2 feet or so. Keep back legs square and weight shifted to back legs by having Harley tuck her head to her chest very slightly. Have her hold this position for 30 seconds. Perform one time – 4-6 days/week. Increase duration every week by 10 seconds until she can hold it for 2 mins.
- Nose stretch – guide Harley’s nose to her hip, keeping forelimbs as even as possible and back limbs square. Do other side. Then go to the other side’s foot, then do other side. Repeat a total of 3 times. No need to hold position for longer than giving a treat or guiding. Perform 4-6 days/week.
- Front leg lifts – gently lift left front for 15-20 secs, then switch to right front. When lifting right front, activate lumbar and gluteal muscles before hand by gently scratching area for 5 secs once. Make sure when lifting limbs not to lift too high or out away from body. Perform 3 times on each side 4-6 days/week.
- Side steps – standing beside Harley’s shoulder, ask her to step sideways for 7-10 steps. Do both directions 3 times. Perform 4-6 days/week. To increase difficulty, have Harley side step over cavalletti’s that are 1-2 inches tall.
- Thigh master – with Harley laying with her hip on the floor, and sitting slightly on sternum, guide Harley to get treat under her ‘up’ back leg, lifting the thigh up. Hold position for 10 secs, and release. Repeat 3 times. Then switch sides. Demo’ed for owner.
- Exercises can be divided into doing on different days. Not all exercises need to be repeated on the same day. However, in an attempt to find a trigger to incontinence, it may be best to perform one exercise per day, and see if Harley develops incontinence.

- Program within hospital: None
- Measurable outcomes:
 - Weight: 48.2 lbs
 - BCS: 3.5/5
 - Goniometry:
 - LH: Hock 35/170; Stifle 40/170; Hip 40/175
 - RH: Hock 35/175; Stifle 38/170; Hip 38/170
- Observation of gait pattern, function, etc: No obvious lameness at this time, however no evaluation at a trot today; no pain response on palpation of inner right thigh; hip extension good; core strength mild to moderate – improved slightly from August; no pain on lumbar palpation; sinks on RH when LH and RF picked up, but much less than previously; responds to stimulation of right lumbar muscle, then sinks less; mild kyphosis at L3-5 but no pain.

- Assessment:

- Progress:
 - Incontinence persists, but improved
 - Improved hip extension and flexion bilateral
 - Improved hock flexion and extension bilateral
 - Improved stifle flexion bilateral
- Deficits remaining from initial plan:
 - Kyphosis still present
 - Weak, but improved RH and core
 - Incontinence still present, but improved
- Remaining problems and goals:
 - Goals: Return to function, increase strength, decrease/control incontinence



- Problems:
 - Urinary incontinence with exercise
 - Decreased abduction of hips
 - Weak right hind, improved
 - Weak core strength, improved
 - Mild kyphosis
- Plan:
 - Recheck in 3-4 weeks to re-evaluate plan

Thursday, September 28th, 2017 – 5th Visit

- S: Harley is BAR. Owner reports that Harley is doing really well, however had a setback last week. On Thursday, owner took Harley to go swimming at a park, but the water was really low, and Harley ran around in mud and water. Harley was incontinent for 48 hours afterward, and was weak on her right hind when urinating. Other than that, Harley has been doing very well. Harley does not have accidents after her exercises; owner is doing 15 mins walks. Owner does note that they blocked off the dirt track, however Harley jumped over the fence today. On weekends, Harley gets more activity running around the yard, and has leaked once afterward. Owner is happy with improvement, stating that Harley is pretty much normal. Muscle tone of right hind appears improved. Owner is still feeding previous kibble, as Pro Plan was cost prohibitive, however she feed 2 ounces of boiled venison.
- O:
 - Treatments: None
 - Owner education: Recommend continue previous exercises. Continue to increase walks to see what point Harley is tolerant. Recommend return to class with 12 inch jumps, and evaluate level of incontinence afterward to determine at what point Harley can handle. No running in deep or loose footing/dirt.
 - Home exercise program:
 - Controlled leash walk for 20 minutes 2-4 times per week; alternate with 20 mins of swimming if able.
 - Kick back stand – controlled sit with a kick back stand. To train this, have Harley sit with front feet on something (a book works well). Gently place hand on chest and ask for a stand. She should stand by keeping front feet still, and lifting back end. Repeat 5 times 4-6 days/week
 - Stand with forelimbs elevated 2 feet or so. Keep back legs square and weight shifted to back legs by having Harley tuck her head to her chest very slightly. Have her hold this position for 30 seconds. Perform one time – 4-6 days/week. Increase duration every week by 10 seconds until she can hold it for 2 mins.
 - Nose stretch – guide Harley’s nose to her hip, keeping forelimbs as even as possible and back limbs square. Do other side. Then go to the other side’s foot, then do other side. Repeat a total of 3 times. No need to hold position for longer than giving a treat or guiding. Perform 4-6 days/week.
 - Front leg lifts – gently lift left front for 15-20 secs, then switch to right front. When lifting right front, activate lumbar and gluteal muscles before hand by gently scratching area for 5 secs once. Make sure when lifting limbs not to lift too high or out away from body. Perform 3 times on each side 4-6 days/week.



- Side steps – standing beside Harley’s shoulder, ask her to step sideways for 7-10 steps. Do both directions 3 times. Perform 4-6 days/week. To increase difficulty, have Harley side step over cavellatti’s that are 1-2 inches tall.
 - Thigh master – with Harley laying with her hip on the floor, and sitting slightly on sternum, guide Harley to get treat under her ‘up’ back leg, lifting the thigh up. Hold position for 10 secs, and release. Repeat 3 times. Then switch sides.
 - Exercises can be divided into doing on different days. Not all exercises need to be repeated on the same day. However, in an attempt to find a trigger to incontinence, it may be best to perform one exercise per day, and see if Harley develops incontinence.
 - Army crawl – have Harley crawl under your knees or across the floor. Crawl ~3 feet. Repeat 4 times. Perform 3-4 days/week.
 - Program within hospital: None
 - Measurable outcomes:
 - Weight: 47.6 lbs
 - BCS: 3/5
 - Thigh circumference:
 - LH thigh circumference: 33 cm
 - RH thigh circumference: 33 cm
 - Observation of gait pattern, function, etc: no evaluation at a trot today; no pain response on palpation of inner right thigh; hip extension good; core strength mild to moderate – same as previous visit; no pain on lumbar palpation; sinks on RH when LH and RF picked up, same as last visit; responds to stimulation of right lumbar muscle, then sinks less; mild kyphosis at L3-5 but no pain; very nice muscle tone of bilateral hind limbs.
- Assessment:
 - Progress:
 - Improved thigh circumference
 - Mild kyphosis present
 - Weak core persists, but improved
 - Incontinence significantly improved
 - Weakness of RH persists, but improved
 - Deficits remaining from initial plan:
 - Kyphosis still present
 - Weak, but improved or at least stable RH and core
 - Incontinence still present, but significantly improved, and owner can pinpoint causes.
 - Remaining problems and goals:
 - Goals: Wish to increase core and lumbar strength, which will help Harley to hopefully long-term maintain bladder strength when exercised.
 - Problems:
 - Urinary incontinence with exercise, but decreasing
 - Improved, but weak right hind
 - Improved, but weak core strength
 - Mild kyphosis
- Plan:
 - Recheck in 6-8 weeks to re-evaluate plan and long-term plan