

Diagnosis of Juvenile Canine Hip Dysplasia (JCHD)

By William B. Henry, Jr. DVM, DACVS. Our surgeons have 10 years experience using JPS Sx. Dr. Henry will give a detailed 2-hour lecture on Juvenile Pubic Symphysiodesis, providing 2 hours of CE on March 14.



"I'm only 14 weeks old but my hips hurt when I run and play. Please help me..."

Fenway, PennHIP DI 0.56

The subjective diagnosis of JCHD was described via the Ortolani sign in 1985 in the veterinary literature¹. Prior to that it was described in children in 1937 by Dr. Ortolani, an Italian pediatrician².

The objective diagnosis of juvenile canine hip dysplasia (JCHD) became available when Dr. Gail Smith, a Professor of Surgery at the University of Pennsylvania School of Veterinary Medicine, developed the PennHIP method of diagnosing hip dysplasia with predictable accuracy as early as 16 weeks of age in 1990³. Dr. Smith also holds a PhD. In biomedical engineering.

The early diagnosis of JCHD was further confirmed and expanded by Dueland and co-workers. They demonstrated the accuracy of PennHIP Distraction Index (DI) in even younger puppies⁴.

Distraction Index measurement (PennHIP method) was the most accurate in predicting the development of DJD (p less than 0.001). Distraction index radiography in puppies 6-10 weeks and 16-18 weeks was the most reliable predictor of hip dysplasia.

What is JPS Sx?

Dueland and co-workers then described the use of Juvenile Pubic Symphysiodesis surgery (JPS Sx) - closure of the cranial portion of the pubic symphysis - as a treatment for JCHD in 2001⁵.

Application of Evidence Based Medicine

Systematic Review of the Literature Describing Surgical Treatments for Canine Hip Dysplasia concluded JPS Sx and total hip replacement (THR) had the strongest evidence to support their clinical efficacy⁶.

Ortolani Sign

The Ortolani maneuver described in children can be easily learned and used in sedated puppies 10 to 18 weeks old to determine the presence of pathologic hip laxity.

Continued next page

CT Corner

See the case study video below to illustrate how we are using CT as a valuable tool in our hospital group:

View video, Porker: Female Lab with front limb lameness (6.24 min) , here: http://www.youtube.com/watch?v=T3X0y5ZY_mk&feature=youtu.be

Continuing Education Opportunities

Drs. Henry, Briere and Reese lead CE courses throughout the year for practicing veterinarians on a wide range of topics in veterinary surgery. Register online!

February 22, 2012:

Dr. Henry, "Degenerative Lumbar Stenosis (L7-S1 Disease)"

March 14, 2012:

Dr. Henry, "Juvenile Pubic Symphysiodesis (JPS)"

March 21, 2012:

Dr. Briere, "Tibial Tuberosity Advancement"

April 25, 2012:

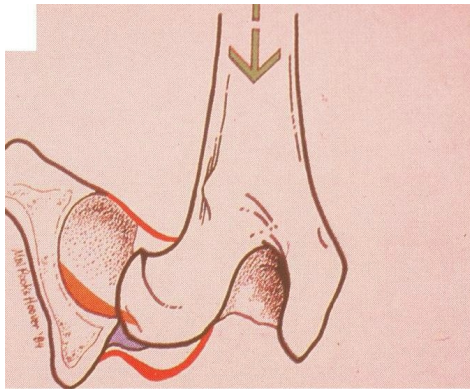
Dr. Briere, "Wound Management and Skin Reconstruction"

From Our Clients

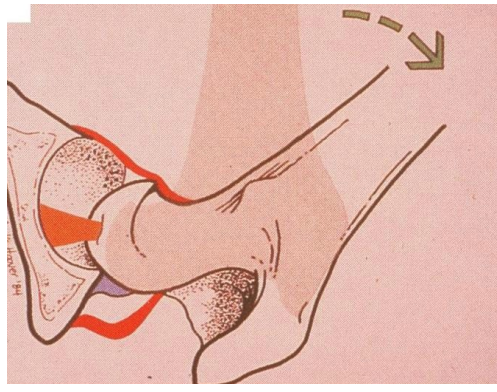


"A picture of Sydney post surgery! Thanks to [the doctors] and the entire staff for such a successful surgery/outcome."

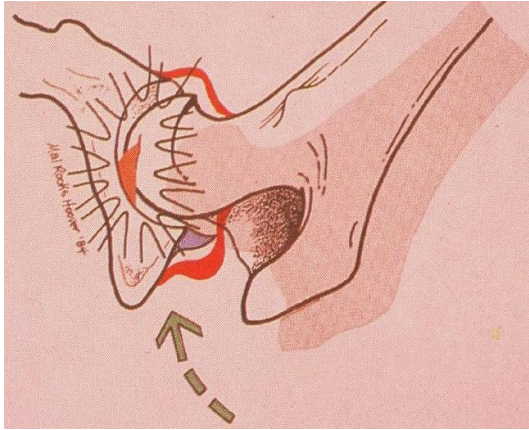
- Bennett Green



1a



2b



3c

Palpation for Ortolani: The puppy is sedated and held in dorsal recumbence: Place your hand on the flexed knee and push the femur straight downward (dorsally) toward the acetabulum (1a). Continue to apply downward (dorsally) pressure on the femur and abduct it towards the table (2b). At some point, usually between 20 and 45 degrees of abduction, the hip will relocate into the acetabulum, often creating an audible sound (3c).

See video demo of Ortolani Maneuver here:

<http://www.youtube.com/watch?v=KP-0oKZsPnE&feature=youtu.be>

A negative test does not rule out hip laxity, it may be a result of insufficient patient relaxation, osteoarthritis or severe abnormality of the coxofemoral anatomy.

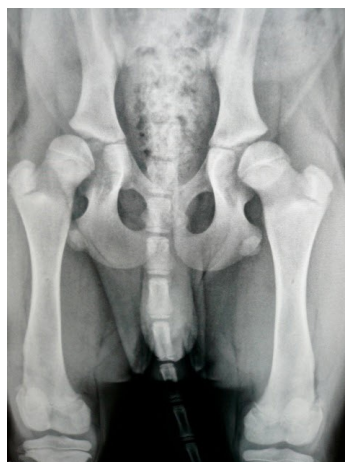


Left: VD pelvic radiograph of an 11 week old Pit Bull Crossbred showing severe JCHD. This puppy did not have any Ortolani Sign because he has "no hip joint". This is shown to emphasize the importance of radiographs as well as palpation when evaluating puppies for JCHD.

PennHIP Radiographs:

PennHIP radiographs are a series of three radiographic views (hip extended, distraction, and compression views) that allow assessment of subluxation and objective measurement of hip laxity, reported as a Distraction Index (DI).

Right: Fenway, PennHIP Extended View



Abstract: Nearly 99% of Golden Retrievers Have Pathologic Hip Laxity

Age-Dependent Prevalence of Radiographic Hip Osteoarthritis of Canine Hip Dysplasia in Golden Retrievers

Authors: Karbe GT¹, Pater ER², Gregor TP³, McKelvie PJ⁴, Smith GK⁵

The diagnosis of canine hip dysplasia (CHD) largely depends on the presence of radiographic osteoarthritis (OA), laxity or both at the time of evaluation.

Routine hip evaluations are performed at 2 years of age; however recent data indicate linear increase of OA-prevalence with age throughout life. This study aimed to investigate the age-dependent prevalence of hip OA in a group of Golden retrievers (GLDR).

Materials and Methods

PennHIP records of previously evaluated GLDR, <7 years of age were analyzed. Joint laxity (D1) and radiographic OA were recorded. For statistical analysis dogs were grouped by DI-interval: A(0.30-0.39), B(0.40-0.49), C(0.50-0.59), D(0.60-0.69), E(0.70-0.79) and F(0.80-0.89).

Results

9,814 GLDR with mean age of 1.5 years and mean DI of 0.55 were included. Radiographic OA was present in 13% of the dogs, OA was not found in dogs with DI<0.30. OA-prevalence increased linearly with age irrespective of DI (R²=0.863, p=0.0003) and when grouped by DI-interval (R²B=0.930, R²C=0.969, R²D=0.925, R²E=0.974). Relative risk for OA doubled with every one-year increase in age (RR=1.89) and every 0.10 DI increase (RR=2.44).

Discussion/Conclusion

Prevalence of radiographic OA in this group of GLDR increased linearly with age and DI. Dogs with lax hips had earlier onset of OA and presumably faster disease progression. Nearly all (99%) GLDR in this study had joint laxity in the OA-susceptible range (DI>0.30), therefore OA-prevalence would likely continue to increase with age. It can be concluded that a large number of dogs evaluated at 2 years of age are falsely diagnosed as CHD-free.

Acknowledgments: PennHIP Analysis Center, Malvern, PA

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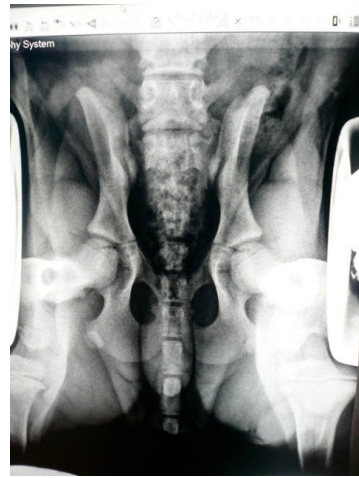
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*PennHIP Distraction View
Fenway, DI 0.56 pre-op*



*Fenway, PennHIP Compression View
The compression view is used to calculate the DI.*

The technique uses the dog's neutral hip angle and a distraction device to yield the DI.

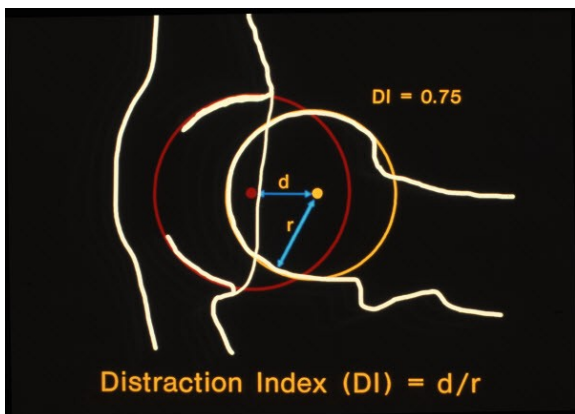


Juvenile Distraction Device



Adult Distraction Device

The DI is a number from 0.00 to 1.00 that quantifies the maximum amount the hip luxates out of the acetabulum under passive conditions. PennHIP distraction indices are highly predictive for the risk of development of osteoarthritis in puppies as early as 10 weeks of age or older - the higher the DI the greater the chance of developing OA later in life. Puppies less than 18 weeks old that have a positive Ortolani and/or PennHIP DI of 0.40 or higher are candidates for JPS Sx. A DI of 0.30 or less is normal and those puppies will not have an Ortolani Sign. They will not develop JCHD or OA later in life nor carry the genes for CHD.



The distance from the center of the hip distraction view and the center of the hip in the compression view is divided by the radius of the hip, gives the DI.

Treatment of Juvenile Canine Hip Dysplasia (JCHD):

Juvenile Pubic Symphysiodesis (JPS Sx) is a prophylactic surgical procedure performed in puppies 10 to 18 weeks of age that have been diagnosed with JCHD. This surgical technique was developed through an increased ability to diagnose JCHD in very young puppies objectively via PennHIP Distraction and greater recognition of pubic symphysis abnormalities in children with hip dysplasia⁷.

JPS Sx. is a minimally invasive, day patient surgical procedure associated with little post-operative morbidity. The procedure causes premature closure of the cranial pubic symphysis. The pubic symphysis is responsible for much of the longitudinal growth of the pubis. Premature closure of the cranial pubic symphysis results in shortened acetabular branches of the pubic bones. This, combined with the normal growth elsewhere in the pelvis, results in outward rotation of the acetabuli, thereby improving acetabular coverage of the femoral heads. This is similar to the effect gained by a triple pelvic osteotomy (TPO), but it occurs gradually during the puppies rapid growth phase.

Closure of the cranial pubic symphysis is accomplished either with an electrocautery needle applied through the physeal cartilage following a special protocol for time and wattage, or by removal of the physeal cartilage with a No. 12 and No. 15 scalpel blades, small bone ronguers and curettes, followed by cauterization of the bone edges. With either technique the insertion of the pubic tendon must be removed to allow placement of a protective instrument to avoid urethral damage. Following surgery, the puppies are restricted to leash walks, avoiding strenuous exercise as much as possible to avoid further stretching of the ligament of the femoral head, until the acetabular rotation stops the subluxation, which can take 4 to 8 months depending on the age at which the surgery was done and the degree of laxity.

All puppies who have JPS Sx are PennHIP certified. Then they are palpated for Ortolani a repeat extended VD radiograph and DI are done at 4 months post-op, and in some cases with high pre-op DIs, at 8 months post-op.



*Fenway, 28-week post-op DI View
(Distraction VD, DI 0.56 pre-op)*



Fenway, 50 week post-op DI 0.15

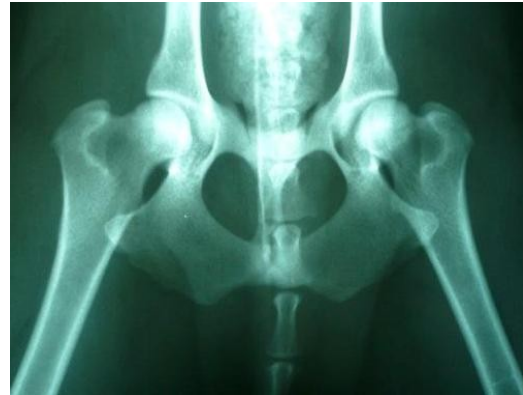


*Fenway 5 years post-op at work
in her duck blind*

JPS Sx is more successful when done at an early age when a significant potential for growth remains, especially in puppies with high DIs. A successful outcome is one in which Ortolani is eliminated and DI is less than 0.30 are achieved.



10-week-old Golden Retriever puppy DI
pre-op 0.78 and 0.68



Golden Retriever 2 years post-op VD
(pre-op DI 0.78 and 0.68)



Golden Retriever 2 years post-op DI 0.10 and 0.15.
Will never have any hip OA.

JPS Sx done successfully precludes more invasive surgery later, ie. TPO, FHO or total hip replacement (THR).

Conclusion

Hip dysplasia is a very prevalent disease and as such primary care veterinarians should strive to become competent in early detection of hip laxity, the Ortolani exam. This will enable better counseling of clients regarding breeding background and potential for JCHD in young puppies (OFA vs. PennHip exam in the Dam and Sire).

Discussing exercise goals and exercise tolerance for newly acquired hip dysplasia prone breeds should be done at an early age, 8-10 weeks, as there are now surgical options in juvenile puppies that are minimally invasive and minimally expensive when compared to later options (TPO, FHO, THR).

¹ Chalman J A , Butler H C. Coxofemoral joint laxity and the Ortolani sign. JAAHA 1985; 21:671-676

² Ortolani, M: Un Segno Poco c sua Impatanza per la Diagnosi Precoce di Prelussazione Congenital Dell'anca. Pediatria 45: 129, 1937

³ Smith G K, et al New concepts of coxofemoral joint stability and the development of a clinical stress-radiographic method for quantitating hip laxity in the dog. JAVMA vol. 196, No. 1, 1990.

⁴ Early Detection of CHD: Comparison of Two Palpation and Five Radiographic Methods. Dueland and co-workers JAAHA 1998; 34:339-47.

⁵ R.T. Dueland et al, Effects of Pubic Symphysiodesis in Dysplastic Puppies. Vet. Surg. 30:201-217; 2001

⁶ Bergh M S et al VOS abst. 2011

⁷ Mathews AM J Vet Res.57: 127-1433, 1996.