

PENNHIP DIAGNOSTIC TESTING:**Putting a number on the looseness of young hips**

Overview—“I don’t understand what an PennHip test is; please help me understand the procedure.”

PennHip is a diagnostic test that was developed at the University of Pennsylvania by Dr. Gail Smith in the 1990s. It involves taking x-rays while the patient is very relaxed (i.e. sedated); three images are taken while stretching the hips to their full “loose” boundary, compressing the hips to their full “well-seated” boundary, and in a standard “lying on back” position to evaluate normal structural anatomy of the pelvis. With these views, we are able to measure (and quantitate with a number), how loose the hips actually are. We also are able to comment on the degree of boney changes of the hip structures that has resulted from hip looseness.

“Why is this procedure being recommended for my pet?”

One of several situations may have led to a recommendation for a PennHip study for your pet.

- On routine exam, excessive hip looseness in a puppy was suspected based on a positive “Ortolani” or “Bardens” maneuver. Knowing “how loose” hips are will allow treatment recommendations to be tailored to your pet.
- Your observations at home reveal hip “clunking” while your pet is walking, and/or your young pet is showing rearlimb difficulties (unwillingness to jump up, bunny-hop when running, trouble with stairs). Knowing “how loose” hips are will allow treatment recommendations to be tailored to your pet.
- A young animal is a candidate for a physically-demanding service work career with significant training resources involved.
- An animal is a candidate for a breeding program; choosing dog parents with “tighter” hips will result in offspring with “tighter” hips (a desirable outcome over time.)

With the numbers that result from the PennHip study, we are able to work through decision-making for each patient. All of the following enter into this decision-making process:

1. degree of hip looseness
2. degree of boney changes around the hip joint
3. age of patient
4. size/weight of patient
5. lifestyle of (or lifestyle plan for) patient
6. breeding potential of patient

“What recommendations might result from PennHip results?”

Lean body weight: Perhaps the most common-sensicle and least invasive (and least expensive!) means for preventing progression of hip arthritis in predisposed loose hips (identified by the PennHip test) is the maintenance of a lean body condition.

One very comprehensive veterinary study is “The Lifetime Labrador Study”. These data showed at 2yrs of age, lean-fed dog hip arthritis 4% (vs. over-fed 25%), at 5yrs of age, lean-fed hip arthritis 13% (vs.

over-fed 39%), at 8yrs of age, lean-fed hip arthritis 14% (vs. over-fed 64%) and at 14yrs of age, lean-fed hip arthritis 50% (vs. over-fed 83%). The onset of pain associated with hip arthritis was on average 3 years sooner for over-fed dogs. **This is the type of data that compels us veterinary professionals to broach the subject of obesity in your pets.** *(Please don't bark at the messengers! We are trying to help your pets.)*

Surgical modifications of pelvis: There are two procedures that are currently used to adjust the pelvis to make loose hips less susceptible to the development of hip arthritis.

Juvenile Pubic Symphysiodesis—This relatively minimally invasive surgical procedure purposefully closes one of the growth plates of the lower pelvis to allow the upper pelvis (where the cup of the hip joint is located) to expand outward as further growth continues. This creates a hip cup that acts more effectively as a “roof” to the ball of the joint, even in loose hips. It has demonstrated positive outcomes when performed **in 4-5 month old puppies** with mild-moderate excessively loose hips.

Triple Pelvic Osteotomy—This procedure, as the name suggests, involves making three cuts in the pelvis, isolating the hip cup, rotating it to create a better “roof” to the ball of the joint and making things stay there with a bone plate until the bones are healed. It has demonstrated positive outcomes when performed in **6-10 month old puppies with excessively loose hips**.

Supplements or medications: We don't have any conclusive veterinary medical studies to strongly recommend prophylactic supplements or medications to prevent arthritis from excessively loose hips. There are a few options that may be preventative for arthritis, with varying degrees of risk/cost.

Glucosamine / Chondroitin (with other various ingredients)—Oral supplement. The “building blocks” of cartilage and joint fluid that may prevent damage to or support the health of cartilage in excessively loose hips.

High dose fish oil (i.e. antioxidant/essential fatty acid)—Oral supplement. “Natural” compounds that may reduce the inflammation (and associated pain and cartilage injury) created when cartilage is damaged from excessively loose hips.

Hyaluronic acid (HA)—Medication injected into joints. Another “building block” of cartilage/joint fluid that may support cartilage being injured by loose hips. Likely requires ongoing, intermittent administration, so may not be a useful preventative tool.

Adequan—Medication injected under the skin. Yet another “building block” of cartilage/joint fluid that may support cartilage. Standard use is in an ongoing manner.

Non-steroidal Anti-Inflammatory Drugs (NSAIDs)—These medications are used to treat the pain of excessively loose hips and arthritis; they do not specifically treat the cartilage health or prevent arthritis.

Discussions about service-work potential: The PennHip provides a number to help make predictions about the future health of tested hip joints. These predictions are extrapolated from large populations of dogs, but certainly can't paint a precise picture for one specific patient. This data is one piece of information that should be balanced with other factors contributing to the candidate selection for

service work. Additional preventative measures can be employed as indicated by an individual dog's hip score to protect "at-risk" looser hips.

Discussions about breeding potential: PennHip scores have been determined to have reliably high heritability in multiple breeds. With this information about heritability, we can apply selection pressure to breeding choices; the optimal plan is to choose parents with hip scores significantly better than the average hip scores for the breed. This will move the offspring hip scores in the desired "tighter" direction the quickest. As hip health is only one component of an overall healthy offspring, other important heritable factors and moderate selection pressure using PennHip scores is a rational approach to optimize a successful breeding program.

"What post-procedural complications do I need to know and understand when considering this procedure?"

Given the physical manipulations used to position a patient's hips, some dogs (based on how loose their hips are) will experience stiffness and soreness several days after the procedure. The medications used for sedation during the procedure are generally safe and relatively short-lived and will leave the system over the course of the procedure day.

Any concerns or difficulties noted in the first few days after the procedure should be brought to the attention of veterinary professionals for recommendations.

It is important that you have proper expectations about this procedure; your experience and you pet's outcome will benefit greatly. Please discuss this information with your veterinarian when working through the decision-making process regarding **the PennHip diagnostic procedure**.

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