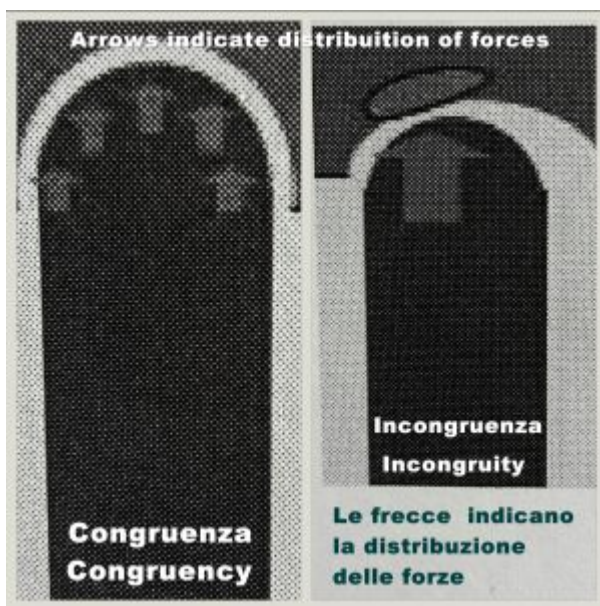


Hip dysplasia (biomechanics)

Much has been written in hip dysplasia in dogs but, studying for my veterinary surgery exam, I am discovering things that owners and breeders usually do not know. A few days ago, I posted something on the biomechanics of the hip joint on Facebook and people asked for more information... Here I am!

To work properly, a joint, any joints, shall be properly built: joint surfaces should be congruent, if they are not, some parts of the joint will have to bear more weight than others.



Scientific studies have demonstrated that the maximum load cartilage can tolerate is 1kg/mm^2 . Prieur, a veterinarian, in 1980 published a very interesting research which is still valid: [Coxarthrosis in the Dog Part I: Normal and Abnormal Biomechanics of the Hip Joint W. D. PRIEUR, D.V.M. 1980](#)).

If we imagine a dog weighting 30 kgs, the total hip joint surface would be 220 square millimeters. In the table you see what happens if the articular surface gets reduced, the smaller the area, the more weight gets concentrated on 1 square mm.

Load kg/mm² on the hip articular surface

• forze in kg/mm² sulla superficie articolare dell'anca (Priour 80)

Articular surface in a 30 kgs dog % in square mm	100% 220	50% 110	30% 66	15% 33
in stazione (STANDING)	0,01	0,2	0,3	0,6
su un solo arto 1 LIMB	0,1	0,35	0,5	<u>1,1</u>
al passo WALKING	0,2	0,65	<u>1,1</u>	<u>2,2</u>
nel salto JUMPING	0,5	<u>1,6</u>	<u>2,8</u>	<u>3,6</u>

In the first column, you see the weight the joint has to bear while the dog is standing on 4 limbs; standing on 1 limb; walking (pacing) and jumping. Anything above 1 kg for square mm damages cartilage. Such a compressed cartilage, in fact, gets "stressed" and changes: it loses elasticity, it softens, it breaks and eventually dies. The joint gets inflamed, becomes swollen, and arthrosis develops. The process cannot be stopped and leads to eburnation: an ivory-like reaction of bone occurring at the site of cartilage erosion. [Osteophytes](#) might develop as well. [Osteoarthritis is a degenerative disease of the joints characterized largely by central loss of cartilage and compensatory peripheral bone formation ([osteophytes](#)). Over time, as the cartilage wears away, bare, subchondral bone is revealed. Eburnation describes the bony sclerosis which occurs at the areas of cartilage loss.



FIG. 83-14 The proximal ends of two femora illustrate the effects of advanced hip dysplasia. New-bone formation (exostoses) encircles the femoral necks at the junction of the head and neck (A). The femoral heads are shortened from wear and the cartilage surfaces are eroded and eburnated (B). (Reproduced with permission from Riser WH: The dysplastic hip joint: Its radiographic and histologic development. JAVRS 14:35, 1973)

Joint incongruity can generate friction which, on its turn, can increase temperatures inside the joint. It has been estimated that temperatures – inside an affected joint -can reach up to 70° Celsius (158°F) in a dysplastic hip joint (dog running).

Ps. Since health is fundamental to a dog's welfare, if you own a gundog (you hunt or run trials with) please check the [Gundog Project](#) and fill out the [survey](#)!

The Gundog Project

[In italiano qui](#)

The Gundog Research Project is a scientific research focusing on gundogs actively used for hunting and field trials. The project has been tailored on pointing dogs, but we are accepting contributions from spaniels and retrievers owners as well. The project stems from two elements: my love for gundogs and, on a more practical side, the need to write a research dissertation to graduate in Veterinary Medicine. Writing a

dissertation is mandatory in Italy and, as it might require months of research, I opted to devote them to something I like, and from which animals and humans could benefit . Dogs have always played a huge role in my life, and certainly helped me to grow into a better person, this is how I am trying to give them something back.

Animal behaviour is intimately linked with animal welfare which, on its turn, is affected by animal management. Most of the animal welfare studies carried on so far, focus on farm animals. Furthermore, working dogs such as hunting and field trials dogs, cannot even be considered “pets”. They are canine athletes, they have their own peculiar needs and they are among the few dogs that can truly be considered working animals. As far as my tutors and I are aware, there is no scientific literature available on hunting and field trial dogs management and welfare: the studies we could find are centered on military, police and shelter dogs and on dogs for the blind. Feel free to [e-mail us](#) if you want to know more about the project scientific design and about the scientific literature behind it.

[Why and how to benefit from the Gundog Research Project \(click here\)](#)

[The team behind the project \(click here to discover more\)](#)

[How to fill out the questionnaire \(click here\)](#)

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If you are interested in supporting this project and help giving it more visibility (through magazines, websites or your club's activities), please do so or contact us. We appreciate and need your help!

[Facebook page](#)

The team behind the project

Some of you already know me, but I am going to introduce myself again to make you feel at ease. My academic background is the following: I have a Laurea Specialistica (equivalent of an MA) in Foreign Languages and Literatures (British Literature) earned with a grade of 110/110 cum laude from the [University of Pavia](#) (Italy); a Certificate of Asian Studies earned with Distinction from [Mount Holyoke College](#) (Massachusetts, USA) and I am going to graduate in [Veterinary Medicine](#) from the University of Milan (Italy). I also attended

the Italian Veterinary Acupuncture Society School and several extracurricular courses on dog behaviour, neuroscience, wildlife management, writing, photography and more.

Work & Hobbies: I started writing about dogs and hunting in 2002, became a professional journalist in 2005 and published two books on dogs. At the moment I am still freelancing for Italian and foreign magazines and my pieces can be read in each issue of Sentieri di Caccia, Beccacce che Passione and Cinghiale che Passione. I have been active around dogs since my childhood, volunteered at a no-kill dog shelter for five years and got my first English Setter in 1999, my first shooting license came in 2004. Years have passed, but I still enjoy the countryside, training, trialing, rough shooting and anything gundogs related. I currently manage the blog [Dogs & Country](#)

My supervisors in this project are Professor [Silvana Mattiello](#) and Professor [Clara Palestini](#), one of the few veterinarians who obtained a diploma from the [European College of Animal Welfare and Behavioural Medicine](#). Both teach and research at the [School of Veterinary Medicine](#), University of Milan (Italy).

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