

PROCEEDINGS

**26th annual meeting of the
INTERNATIONAL ELBOW WORKING GROUP**



**October 8th & 9th 2011
Novotel Amsterdam City
Amsterdam, Holland**

WELCOME ADDRESS

Dear participants,

The board of the International Elbow Working Group (IEWG) is proud to welcome you at the 26st meeting of the Group. The IEWG has been founded by a group of veterinarians and dog breeders in 1989 with concern about the growing incidence of elbow diseases among young dogs of a variety of breeds. The aim of this non-profit organization is to gather and exchange knowledge and experiences in the field of hereditary elbow diseases, all leading to lameness and osteoarthritis of the elbow joint in dogs. During the passed two decades, more awareness was gained of the different entities grouped together under the umbrella name 'Elbow Dysplasia'. Different aspects have been focused upon during the IEWG-congresses, including incidence of ED in different dog breeds in different countries, the clinical aspects (including clinical and radiological signs, treatment modalities and prognosis), but especially the hereditary aspects and the elbow screening. The latter includes both the system of radiological investigation for grading, the rules how to grade and the documentation on registration forms, and the results which has been gained with it.

The screening and grading system as introduced by the IEWG is in use in many (national international) kennel clubs and works fine to separate ED-free breeding dogs from those dogs with one or more forms of ED. The criteria for ED-grading are outlined at the web site of the IEWG. Both the meetings and the website of the IEWG is open to all veterinarians who are in any way interested in the above mentioned aspects of elbow dysplasias; the threshold to participate is kept as low as possible, and no membership is mandatory to participate in the congresses or in the discussion. The newest insights of ED are presented on the web site, together with the proceedings of the IEWG-meetings during recent years, allowing veterinarians to stay informed even when they are not in the possibility to participate in the annual meetings. Often the annual meetings are hold in conjunction with the World Small Animal Veterinary Association (WSAVA) world congress, since IEWG is a affiliate member of that world veterinary organization.

However, in 2005, the IEWG had a meeting organized in collaboration with the Federation Cynologique International (FCI) in München (Germany) to discuss the screening and scoring of radiographs of elbow joints with screeners. Adaptations had been made to the protocol after the discussion with the participants of the meeting. Also the ED-certificate was introduced, giving insight in the identification of the investigated dog, its owner and the screeners, and also in the amount and direction of radiological views used for screening, and the findings of the final score (a copy of the registration form is present at the last page of these proceedings). In 2007 a course for ED scruteneers was organized, to train the grading scheme; at this meeting veterinarians originating from 22 different countries participated.

Grace to the initiative of Prof. dr. Hedhammar, board member of the scientific committee of FCI at that time, the IEWG board decided to organize a meeting for scruteneers in Amsterdam (The Netherlands) in 2011, to discuss again the use of the present IEWG-screening system, and if and how the system can be updated, based on the experience of those who frequently use the system. We are grateful to Prof dr Flückiger who has always a prominent place in the program of the IEWG when it comes to instruct how to make proper elbow radiographs and how to read these radiographs. In addition we are grateful to the board of the Dutch Kennel Club, who supported the IEWG this year in the organization of the meeting. Hill's Pet Food is acknowledged for the financial support.

The board of the IEWG tries to organize the annual IEWG meetings according to the needs in the veterinary field, on a low-profile basis and thus as accessible as possible for the interested veterinarians. In case you have questions, regarding matters related to ED screening, do not hesitate to contact one of us and we would be happy to help you further. Our email addresses are at the web site of the IEWG (www.iewg-vet.org) directly or via the website interesting for all veterinary surgeons www.orthovetsupersite.org as organized by Dr. Vezzoni (I).

The board of the IEWG wishes you a fruitful meeting and a pleasant stay in Amsterdam.

Prof. dr. H.A.W. Hazewinkel, chairman
Dr. B. Tellhelm, treasurer
Dr. K.L. How, secretary

Expectations from FCI on IEWG and the international conference of Elbow Dysplasia scrutinizers

Communicated by professor **Å. Hedhammar** as appointed liaison person between FCI Scientific Commission and IEWG

Together with the American British and Canadian Kennel Clubs (AKC, KC/UK, CKC), FCI depend on reliable screening procedures for national genetic health programs. As breeding of Dogs nowadays is a truly international “business” it is of equal importance that procedures and scoring is as universal as possible.

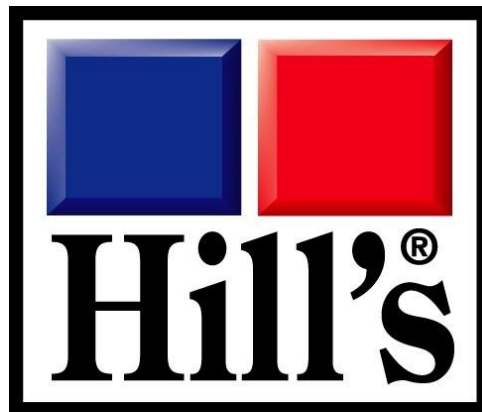
FCI - and I trust also AKC, KC/UK and CKC- welcomes the initiative that IEWG host and govern the development of rules and regulations for the screening procedures to produce reliable radiographs as well as the procedure to score and record scoring result in a standardized fashion. Based on that Kennel Clubs worldwide will be able to set up rules and regulations for their usage in efficient breeding programs.

An international and formally approved certificate need to be based on procedure notes and agreed bases for scoring that can be refereed to by the cynological organizations in their rules and regulations.

It is my hope that the experienced scrutinizers gathered for this Conference are able to produce guidelines for screening procedures as well as guidelines for scoring the results that formally can be approved by FCI, AKC, AKC and KC/ UK for their screening programs and refereed to as “according to IEWG”.

That also calls for a formalization of the IEWG structure, needed to assure continuity, impact and involvement of those to great extent are in charge of the formal scoring procedure. This is an important task for the scrutinizers and as outside that group I sincerely hope that today’s conference will result in the formation of task groups that based on the experiences today will finalize formal procedure notes on screening and scoring and also on suggestions for a formalized procedure within IEWG to guarantee updating and spread of these procedure notes.

**The International Elbow Working Group
acknowledges the financial support by**



HILL'S PET NUTRITION

PROGRAMME IEWG 2011

October 8th & 9th 2011

Novotel Amsterdam City

Amsterdam, Holland

Saturday, October 8th 2011.

- 08.30 – 09.00 Registration
- 09.00 – 09.10 Welcome.
Prof. Dr. H.A.W. Hazewinkel, president of the IEWG.
- 09.10 – 09.30 Opening.
Prof. Dr. Å. Hedhammar, representative FCI.
- 09.30 – 10.00 Radiological development of the elbow joint.
Prof. Dr. G. Voorhout
- 10.00 – 10.30 Radiographic procedure and scoring of Elbow Dysplasia in the dog.
Prof. Dr. M. Flückiger
- 10.30 – 11.00 Coffee Break
- 11.00 – 11.30 Grading primary ED-lesions and elbow osteoarthritis according to the IEWG protocol.
Dr. B. Tellhelm
- 11.30 – 12.30 Film reading session
Examples of different grades of osteoarthritis and grades of ED will be discussed
- 12.30 – 14.00 lunch
- 14.00 – 15.00 Proposals of participants of the conference to adapt the IEWG system.
- 15.00 – 16.00 Short communications (15 min. max.) from participants to share experiences of organizing a national elbow screening program and results of elbow status in different countries.
- 16.00 – 17.00 Determine actual International Elbow Dysplasia scoring scheme, procedures, organisation of the IEWG
- 17.00 Closing remarks

Cocktails

Congress dinner will be at the "Rosarium", opposite the Novotel. The dinner will be hosted by the Dutch Kennel Club (Raad van Beheer op Kynologisch Gebied in Nederland)

PROGRAMME IEWG 2011

October 8th & 9th 2011

Novotel Amsterdam City

Amsterdam, Holland

Sunday, October 9th 2011.

- | | |
|---------------|--|
| 09.00 – 09.15 | Interesting cases of ED
Dr. B. Tellhelm |
| 09.15 – 09.30 | Old dogs with ED diagnosed by bone scintigraphy
Dr. L.W.L. van Bruggen |
| 09.30 – 09.45 | Reduction in the incidence of Elbow Dysplasia in four large-dog breeds
as measured by the New Zealand Veterinary Association scoring scheme
Dr. A.J. Worth |
| 09.45 – 10.00 | Epidemiology of ED in several breeds in the Netherlands
Mrs. I.C.M. Lavrijsen |
| 10.00 – 10.30 | coffee break |
| 10.30 – 10.45 | The current status of ED in the UK population
Dr. B. Turner |
| 10.45 – 11.00 | The role of body weight and condition on ED screening
Prof. dr. A. Hedhammar |
| 11.00 – 11.15 | Microcomputed tomography and histology of a fragmented medial
coronoid process in a 20-week-old golden retriever.
Dr. C.F. Wolschrijn |
| 11.15 – 11.30 | How to apply the IEWG scorings scheme (continuation of film reading session of
saturday) |
| 11:30 11:45 | Closing remarks. End of the conference |

List of speakers

Dr. L.W.L. van Bruggen, DVM, Dipl. ECVDI,
Division of Diagnostic Imaging,
Department of Companion Animal Sciences,
Faculty of Veterinary Medicine, Utrecht University,
PO box 80.154, 3508 TD Utrecht, The Netherlands.

Dr. M. Flückiger, Prof., Dr. med. vet., Dipl. ECVDI,
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Dr. Å. Hedhammar, Prof., DVM, MSc, PhD, Dipl. ECVIM-CA [active], Dipl. ECVCN [passive]
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Dr. B. Tellhelm, Dr. Med. Vet., Dipl. ECVDI,
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Dr. B. Turner, BVSc DVR CertSAO MRCVS,
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Dr. G. Voorhout, Prof., DVM, PhD, Dipl. ECVDI,
Division of Diagnostic Imaging,
Department of Companion Animal Sciences,
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Dr. A.J. Worth, BVSc, PGDipVCS, MACVSc (Radiology), FACVSc (Surgery),
Registered Specialist Small Animal Surgery, Senior Lecturer Massey University,
Massey University, Veterinary Teaching Hospital,
IVABS, Tennent Drive, Palmerston North 4442, New Zealand.

Dr. C.F.Wolschrijn, DVM, PhD, Spec. Surgery Companion Animals (KNMVd)
Division of Anatomy, Department of Pathobiology,
Faculty of Veterinary Medicine, Utrecht University,
PO Box 80.158, 3508 td Utrecht, The Netherlands.

Radiographic procedure and scoring of Elbow Dysplasia in the dog

(Requirements for the IEWG standardized screening procedure, updated version 2011)

Prof. dr. M. Flückiger

Radiographic technique

1. Minimal age for official screening is 12 months
Some breed-clubs have issued specific requirements!
Dogs showing an elbow lameness should get radiographed at any age
2. Both elbows are radiographed
3. Rare Earth screens with a speed of 200 or less are recommended except in digital systems
4. The elbow is placed directly on the cassette, no grid is needed
5. The beam is collimated to improve image quality (does not apply in digital systems)
6. For the mediolateral projection the elbow is flexed (45-60° opening angle between humerus and radius), resulting in concentric superimposition of the humeral condyles. Good results are achieved with a 50 – 60 kV-setting
7. The MCP is best identified with the limb extended and 15° supinated. An additional craniocaudal 15° pronated view is strongly recommended to identify OC lesions
8. Radiographs are permanently marked including the date of the examination, the identity of the dog, the identity of the owner of the dog and the clinic making the study

Film interpretation procedure

9. Radiographs are screened for elbow disease by qualified persons, preferably ECVDI/ECVS or ACVR/ACVS diplomates. An open list of qualified persons has been filed at the FCI office by the advisory panel of the scientific committee of the FCI
10. If the elbows cannot be graded, a second examination is indicated after 3 months
11. A possibility for appeal prior to release of the results is provided
12. Results of the evaluation are open to researchers, dog owners and breeders
13. Radiographs will be archived at an appropriate location for 10 years

Film interpretation

Radiographic findings vary depending on breed and etiology, severity, and duration of ED. The radiographic diagnosis of ED is based on presence of arthrosis and/or a primary lesion such as
malformed or fragmented medial coronoid process
ununited anconeal process, both partially or completely
osteochondrosis of the medial humeral condyle
marked incongruity of the articular surfaces suggesting radio-ulnar length discrepancy and humero-ulnar incongruity (step formation, subluxation)

Further findings (of unknown etiology and relevance) may be
mineralisation of periarticular soft tissue (flexor tendons originating at medial humeral epicondyle)
DJD resulting from unknown origin
any other abnormality noted

Normal elbow joint, radiographs



mediolateral view, 45 ° flexed



cranio-15°lateral-caudomedial view
(i.e. craniocaudal projection, 15° pronation)

Primary ED-Lesions (IEWG)

- Fragmented medial coronoid process (FCP)
- Osteochondritis (dissecans) medial humeral condyle (OCD)
- Ununited Anconeal process (UAP)
- Severe Incongruity/step between radius and ulna (Inc)

Radiographic findings indicative of FCP



Mediolateral radiograph (not all features may be noted!):

- Indistinct and/or deformed contour of the medial coronoid process.
- Irregular / reduce bone opacity of the medial coronoid process
- Note: A fragment is rarely seen!
- Increased subchondral bony opacity (sclerosis) in distal part of semilunar notch, and loss of trabecular pattern. (Sclerosis is rarely noted in German Shepherds with FCP!)
- Step formation between radius and ulna
- New bone formation dorsally and laterally on the anconeal process, on the cranial border of the radius, on the medial humeral condyle, on the lateral humeral epicondyle
- Uneven joint space width between humerus and radius.

Cranio-caudal radiograph (not all features may be noted!):

- New bone formation on the medial articular border of humerus and ulna
- Visualisation of a bony fragments is uncommon
- Step formation between radial and ulnar subchondral bone plate, particularly medially
- Humeroradial joint space medial wider than lateral, particularly in Bernese Mnt dogs
- Occasionally a subchondral bone defect is seen in the medial humeral condyle (OCD or kissing lesion) with or without subchondral sclerosis, while a bony flap is rare.

Beware of artifact: The sagittally running radiolucent line within the MCP usually represents the edge of the ulna and not a fissured PCM!

Findings with OC/OCD (Osteochondrosis, Osteochondritis dissecans) or contact lesions



DJD similar to FCP, but usually less pronounced. Typical findings are

- Defect in articular surface of medial humeral condyle, best seen either on the craniocaudal or mediolateral extended view
- A detached bony fragment is rarely present
- The defect may be missed with suboptimal positioning and a ml projection alone!

Findings with UAP (ununited anconeal process)



- Irregular radiolucent vertical line between anconeal process and ulna after 18 weeks of age
- Incomplete fusion results in a patchy irregularly mineralized AP
- Irregular subchondral sclerosis
- Progressive DJD depending on duration of process

Scoring (updated 2010)

The elbow findings are scored according to severity of the arthrosis (DJD) and/or presence of a primary lesion using the IEWG (International Elbow Working Group) protocol

Elbow Dysplasia Scoring		Radiographic Findings
0	Normal elbow joint	<input type="checkbox"/> Normal elbow joint, <input type="checkbox"/> No evidence of incongruency, sclerosis or arthrosis
1	Mild arthrosis	<input type="checkbox"/> Presence of osteophytes < 2 mm high <input type="checkbox"/> Minor sclerosis of the base of the coronoid processes
2	Moderate arthrosis or suspect primary lesion	<input type="checkbox"/> Presence of osteophytes of 2 - 5 mm high <input type="checkbox"/> Obvious sclerosis of the base of the coronoid processes <input type="checkbox"/> Step of 3-5 mm between radius and ulna (suspect INC) <input type="checkbox"/> Indirect signs for a primary lesion (UAP, FCP, OCD)
3	Severe arthrosis or evident primary lesion	<input type="checkbox"/> Presence of osteophytes > 5 mm high <input type="checkbox"/> Step > 5 mm between radius and ulna (obvious INC) <input type="checkbox"/> Obvious presence of a primary lesion (UAP, FCP, OCD)

A **borderline** score between ED 0 and ED 1 is allotted to dogs with minimal anconeal process modelling of undetermined aetiology in some countries.

Differential diagnoses (a selection)

Common

- Panosteitis (Enostosis)

Less common

- Premature closure of a growth plate (usually distal ulna, traumatic in origin)
- Non-traumatic short ulna syndrome or elbow malformation in chondrodysplastic dogs (Basset, Welsh Corgi, and other breed)
- Enthesopathy (metaplasia) of flexor muscles originating at the medial epicondyle
- Trauma induced elbow arthrosis

Rare

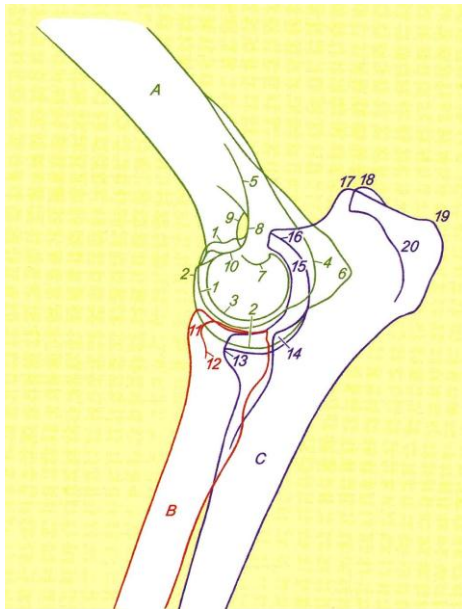
- Osteomyelitis
- Septic arthritis
- Hypertrophic osteodystrophy
- Incomplete ossification of the humeral condyle (IOHC)
- Mineralisation of extensor muscle origin at lateral epicondyle
- Congenital elbow luxation with lateral displacement of the radial head

References

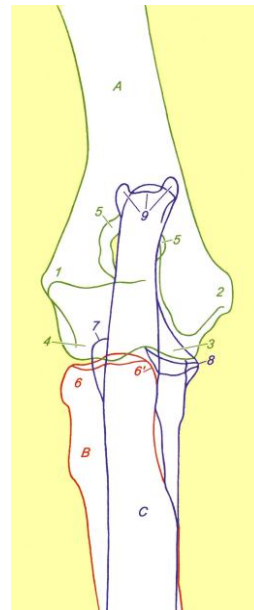
- <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi> (Enter: Elbow dysplasia canine)
- Morgan JP, Wind A, Davidson A: Hereditary bone and joint diseases in the dog, schlütersche 2000.

Normal Elbow Joint (from Waibl et al.: Atlas of Radiographic Anatomy of the Dog, Parey 2003)

mediolateral view



craniocaudal view



Legend

A Humerus

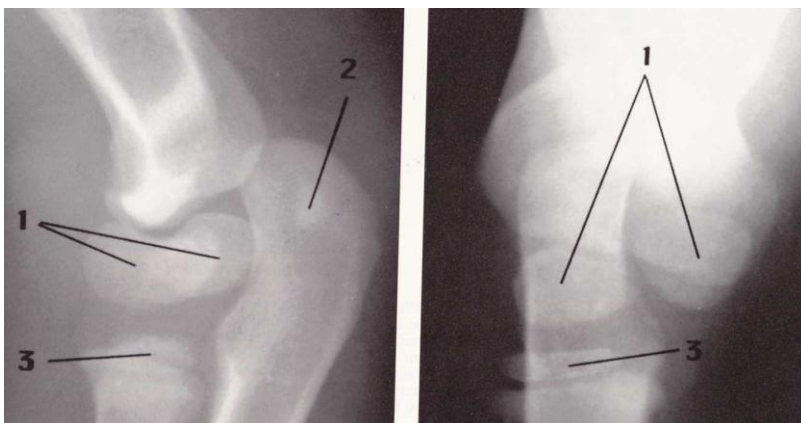
B Radius

C Ulna

- 2 medial humeral condyle
- 4 lateral epicondyle
- 6 medial epicondyle
- 13 medial coronoid process
- 14 lateral coronoid process
- 16 anconeal process

- 3 medial humeral condyle
- 7 lateral coronoid process
- 8 medial coronoid process

Ossification centers in the elbow joint of a puppy



Ossification centers of 1 humeral condyle, 2 medial epicondyle (anconeal process not yet visible!), 3 proximal radial epiphysis.

Grading primary ED-lesions and elbow osteoarthritis according to the IEWG protocol

Dr. B. Tellhelm

The diagnosis of canine elbow dysplasia (ED) in screening programs is based on the evaluation of radiographs according to the protocol of the International Elbow Working Group (IEWG). The most recent update of this protocol is available on the IEWG web site (<http://www.iewg-vet.org>). A mediolateral flexed projection of each elbow joint is mandatory for interpretation and an additional craniocaudal view is highly recommended. The IEWG protocol registers signs of arthrosis and the presence of the major forms of primary lesions (FCP, OCD, UAP, Incongruity). The films are evaluated in a two-stage process: a) to assess the degree of secondary joint disease (arthrosis) and b) to check for signs of a primary lesion. Any other abnormal finding should also be reported.

The status of the elbow joint regarding arthrosis is scored as either “normal” (Grade 0), mild (Grade 1, osteophytes less than 2 mm high anywhere in the joint), moderate (Grade 2, osteophytes 2 – 5 mm high) and severe (Grade 3, osteophytes higher than 5 mm). In the updated protocol the severity of joint incongruity has been included.

The primary lesions have been defined by the IEWG (for details see the IEWG website).

Scoring (updated 2010)

The elbow findings are scored according to the severity of the arthrosis (DJD) **and/or** the presence of a primary lesion

Elbow Dysplasia Scoring		Radiographic Findings
0	Normal elbow joint	Normal elbow joint, No evidence of incongruency, sclerosis or arthrosis
1	Mild arthrosis	Presence of osteophytes < 2 mm high Minor sclerosis of the base of the coronoid processes
2	Moderate arthrosis or suspect primary lesion	Presence of osteophytes of 2 - 5 mm high Obvious sclerosis of the base of the coronoid processes Step of 3-5 mm between radius and ulna (INC) Indirect signs for a primary lesion (UAP, FCP/ Coronoid disease, OCD)
3	Severe arthrosis or evident primary lesion	Presence of osteophytes of > 5 mm high Step of > 5 mm between radius and ulna (obvious INC) Obvious presence of a primary lesion (UAP, FCP, OCD)

A Borderline (BL) score between ED 0 and ED 1 is allotted to dogs with minimal anconeal process modelling of undetermined aetiology in some countries.

How many projections?

The minimal requirement is a true ML projection of each elbow. Excessive pronation or supination should be avoided. In a maximally flexed position (as it is the standard view in many countries) the elbow is usually markedly supinated, making correct interpretation of sclerosis and spur formation cranially difficult.

An OC defect may easily be missed on the ML projection, but can usually be identified on a Cr Cd 15° pronated view. As scrutineers in many European countries (Scandinavia, UK) ask only for a maximally flexed ML view of the elbows, an OC lesion may not be recognized.

For many years a Cr15L-CdMO pronated view was considered mandatory for the diagnosis of FCP. However recent results of CT examinations and arthroscopy indicate that radiological findings typical for the presence of FCP can be identified on the ML view quite consistently. The ML projection may therefore be sufficient to diagnose or suspect the presence of a FCP reliably in a screening program.

How to score ED?

ED scoring on the basis of a combination of the severity of arthrosis (DJD) and suspicion or evidence of a primary lesion is not uniformly used in Europe and overseas. The Scandinavian countries for example started scoring in the early 80ies prior to the foundation of IEWG. Their classification is based on the degree of arthrosis, while of the primary lesions only UAP is recorded. This scoring system is used in Scandinavia and also in the UK and USA/Canada.

The most common primary elbow lesion is a FCP. Pertinent radiological findings on the ML projection are a blurred and deformed cranial edge of the medial coronoid process (MCP), a reduced opacity of its tip, an increased opacity of the ulnar notch at the level of the coronoid processes and an increased and/or incongruent joint space between humerus and radius. It is important to recognize that even minimal changes are usually pathognomonic for FCP qualifying an elbow for at least an ED grade 2 (moderate ED, Coronoid disease/ *suspicion of FCP*) according to the current IEWG protocol regardless of the height of osteophytic new bone formation. The severity of new bone formation is quite variable and some dogs may not show any new bone formation at all. If grading is based on the size of the osteophytes only, many elbows with FCP will be underscored and may even be considered free of ED.

Beware of conflicting data

As mentioned above the IEWG scoring system is a two-step procedure, a) assessing the degree of arthrosis and b) registering any signs indicative of a primary form of ED. Bear in mind that various countries in Europe and overseas only rely on step a). Both concepts have proven to be useful in reducing ED in a population. However problems arise when dogs are to be used for breeding in countries with differing scoring system. In such a case it is advised to re-score the dog again according to the local scoring mode. It will be the aim of IEWG to harmonize the scoring systems in the future.

Slice imaging and appeal procedure

Diagnosing FCP radiographically may be based on subtle findings which may be difficult to convey to the dog owner. As a consequence an increasing number of appeals are filed and owners ask for a CT study to be included in the re-evaluation process. No standardized protocol for CT examination of the canine elbow have been proposed. IEWG plans to install a standardised protocol for appeal procedures, the use of CT and/or MRI examinations and the technical requirements of such studies.

Old dogs with ED diagnosed by bone scintigraphy

L.W.L. van Bruggen, H.A.W. Hazewinkel, C.F. Wolschrijn, G. Voorhout, Y.W.E.A. Pollak, P. Y. Barthez

Few reports have been published regarding the use of scintigraphy in the diagnosis of elbow joint lameness in dogs. Some authors have speculated about the potential use of bone scintigraphy and its suspected high sensitivity for the early diagnosis of abnormalities of the medial coronoid process (MCP) in dogs. Scintigraphy has been used routinely in our institution in dogs presented for thoracic limb lameness and/or suspected of abnormalities of the MCP when radiographic findings were equivocal. Radiographic, scintigraphic and surgical findings of elbow joints of 17 dogs with elbow joint lameness were compared to radiographic, scintigraphic and necropsy findings of the elbow joints of 12 clinically healthy Labrador retrievers. Quantitative evaluation of scintigraphic images was performed to determine relative radiopharmaceutical uptake in the region of the medial coronoid process. Maximum relative uptake of the coronoid process in the normal dogs was taken as a threshold value to classify elbows as positive or negative for an abnormal MCP after all 24 elbows of the 12 healthy dogs were confirmed as being normal at necropsy. All 17 elbows from lame dogs were positive on scintigraphy and confirmed as having chondromalacia, a fissure or fragmentation of the medial coronoid process. Based on our results, bone scintigraphy may be a valuable diagnostic tool for the diagnosis of abnormalities of the MCP in dogs and particularly in older dogs where clinical and radiographic changes may be ambiguous.

Reference: Bone scintigraphy for the diagnosis of an abnormal medial coronoid process in dogs. Vet Radiol Ultrasound. 2010 May-Jun;51(3):344-348

Epidemiology of Elbow Dysplasia in several breeds in the Netherlands

I.C.M. Lavrijsen, H.C.M. Heuven, P.A.J. Leegwater, H.A.W. Hazewinkel

Between 2002 and 2010 almost 10,000 dogs have been screened for elbow dysplasia in the Netherlands. All dogs were assessed based on four radiographic views, and graded according to IEWG protocol by a panel of three experts. In the screened breeds, prevalence of ED ranged from 4 to 33%. The most frequently screened breeds included the Labrador Retriever, Golden Retriever, Bernese Mountain Dog and Newfoundlander, together making up two third of the data set. Almost all ED cases were diagnosed with FCP. It was often the only primary disease present (70%), but sometimes presented together with either INC (16%) or OCD (8%). In Labrador Retrievers, ED was more prevalent in males than females, while in Bernese Mountain Dogs ED was equally prevalent. Heritability for ED ranged from 0.12 to 0.33 in the four frequently screened breeds. Screening was mainly limited to potential breeding stock; only a small proportion of the total population was screened, even in the frequently screened breeds, and many of the screened animals were later used in breeding.

Scientific Article

Reduction in the incidence of elbow dysplasia in four breeds of dog as measured by the New Zealand Veterinary Association scoring scheme

AJ Worth^{*†§}, JP Bridges[†] and G Jones[‡]

Abstract

AIM: To determine if there has been any reduction in the incidence of elbow dysplasia in four popular large-dog breeds as measured by the New Zealand Veterinary Association (NZVA) scoring scheme.

METHODS: A retrospective analysis of the NZVA elbow dysplasia database was performed using records of all German Shepherd dogs, Labrador Retrievers, Golden Retrievers and Rottweilers that had undergone evaluation since the scheme's inception in 1992. The data for each dog included date of birth, date of radiography, gender, grade of left and right elbow (0, 1, 2 or 3), and accredited or dysplastic status. Ordinal logistic regression was used to model the grade of the worst-affected elbow over time. The model included age at scoring and gender as additional variables. Given the known heritability of elbow dysplasia, the hypothesis was that if the NZVA scheme effectively identifies elbow dysplasia, and that dog breeders have been using the data responsibly, there should have been a trend towards a lower incidence of dogs graded dysplastic over time.

RESULTS: In all four breeds, there was a significant trend towards lower grades of the worst-affected elbow over time. For German Shepherd dogs the incidence of elbow dysplasia (worst elbow grade not zero) fell from 75% to 47% between dogs born in 1991 vs those born in 2008. The corresponding figures were a drop from 86% to 68% for the Labrador Retriever, from 89% to 77% for Golden Retrievers, but only 98% to 95% for Rottweilers. In the Rottweiler and Golden Retriever, gender had a significant effect on the worst elbow grade. In the Golden Retriever, age at scoring also had a significant effect.

CONCLUSIONS: There has been a significant reduction in the incidence of elbow dysplasia in four popular large-dog breeds as scored by the NZVA elbow dysplasia scoring scheme. The limitations of the study are the non-compulsory nature of the elbow dysplasia scheme, and the potential bias caused by dog breeders or veterinarians pre-screening potential submissions. The results therefore may not represent those of the overall population.

CLINICAL RELEVANCE: The incidence of elbow dysplasia, as measured by the NZVA elbow dysplasia scheme, has reduced

in the four breeds investigated since the scheme's inception. The New Zealand Kennel Club (NZKC) and the veterinary profession can confidently support the NZVA scoring scheme, and should promote its use by dog breeders.

KEY WORDS: *Canine elbow dysplasia, New Zealand Veterinary Association, NZVA, elbow scores, International Elbow Working Group, IEWG*

Introduction

Developmental abnormality of the elbow joint was first described in 1965 as degenerative joint disease (DJD) of the elbow joint in association with an ununited anconeal process (UAP) (Corley and Carlson 1965). UAP was first described in German Shepherd dogs (Stiern 1956), and a heritable basis was later demonstrated by Corley *et al.* (1968). Osteochondritis desiccans (OCD) of the medial aspect of the humeral condyle and fragmentation of the medial coronoid process (FCP) of the ulna were subsequently identified as further primary lesions that lead to early DJD of the elbow joint (Hayes *et al.* 1979). In 1993, the term 'elbow dysplasia' was adopted by a meeting of the American and Australian Kennel Clubs, the Kennel Club (United Kingdom), the Fédération Cynologique Internationale, the World Small Animal Veterinary Association, and the International Elbow Working Group (IEWG,) to encompass all three individually recognised lesions, *viz* UAP, OCD and FCP, that lead to progressive DJD from an early age (Bedford 1994). Initially they were all considered manifestations of osteochondrosis, but recent evidence points to differing aetiologies (Schulz and Krotscheck 2003). A mating study in Labrador Retrievers indicated that OCD and FCP are inherited independently as polygenetic traits (Padgett *et al.* 1995). Heritability estimates for OCD and FCP are as high as 0.45 (females) and 0.77 (males) (Guthrie and Pidduck 1990).

In 1986, Alida Wind (Wind 1986ab) proposed that incongruity of the elbow joint due to differential growth rates of the radius and ulna or relative oversize of the humerus could lead to mechanical overloading of specific parts of the elbow's articulation. As a result, in 1999 the IEWG added DJD due to incongruity of the elbow as the fourth manifestation of elbow dysplasia. Elbow dysplasia primarily affects large- and giant-dog breeds, with

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DJD	Degenerative joint disease
FCP	Fragmentation of the medial coronoid process
IEWG	International Elbow Working Group
NZKC	New Zealand Kennel Club
NZVA	New Zealand Veterinary Association
OCD	Osteochondritis desiccans
UAP	Ununited anconeal process

BVA/KC Elbow Dysplasia scheme.

Dr. B. Turner and Dr. S. Scott.

The scheme started in 1998, using three radiographic views of each elbow for assessment. 436 dogs were scored in the first year upto 850 dogs by 2003. In 2004 the craniocaudal view was dropped from the requirements as only 2% of the scores were influenced by this view and the IEWG would accept one or two lateral views. A discounted scoring fee was also introduced for combined ED and HD submissions. We expect to score 3700 dog's elbows this year, approximately 50% are labradors. The general trend since 1998 has been for the percentage of 0 scores to increase, currently 83% and the percentage of 2 & 3 scores to decrease, 2% & 5% respectively. Submissions are accepted digitally or on film and all UK dogs must be microchipped.

Effects by weight and Body Conditions Score (BCS) at screening for ED.

Prof. Dr. Å. Hedhammar, Dr. J. Johansson and Dr. S. Malm,

The effects on skeletal development and skeletal diseases of nutritional composition and energy intake during growth as well as by resulting weight and body condition score is well documented in many experimental studies. Specific effects on ED as a clinical entity have been indicated in experimental as well as epidemiological studies.

Data on the effects on the ED score by weight in 9 000 Labrador Retrievers screened 2005–2010 will be reviewed.

The effects by weight and owner perceived BCS at screening for birth cohort (born 2000) of the same breed have earlier been reported (Sallander, Hedhammar and Trogen 2006). These dogs have been followed for BCS and clinical signs at 5 yrs of age and are now contacted at 10 years of age for a final follow up of outcome.

The nutritional effects and the value of recorded weight at screening for calculations of a breeding index for ED will be discussed.

Reference: Sallander MH, Hedhammar A, Trogen ME. 2006 Diet, exercise, and weight as risk factors in hip dysplasia and elbow arthrosis in Labrador Retrievers. *J Nutr.* Jul;136 (7 suppl): 2050S-2052S.

Microcomputed tomography and histology of a fragmented medial coronoid process in a 20-week-old golden retriever.

Dr. C.F. Wolschrijn, Dr. E. Gruys and Dr. W.A. Weijs.

A 20-week-old male golden retriever, which was not lame and showed no clinical signs of a fragmented medial coronoid process (FCP), was euthanased for another study and perfused intravenously with formaldehyde. Gross dissection revealed no abnormalities within the right elbow joint. The medial coronoid process was excised, embedded in methylmethacrylate, scanned in a microcomputed tomography (microCT) scanner and sectioned for histology. The microCT scans revealed a dense trabecular bone structure, much denser than in other dogs of similar age, which was considered to be responsible for the sclerosis visible at the base of the coronoid process in radiographs. Three-dimensional reconstructions indicated that there was a small step within the subchondral bone, extending from the apex towards the radial notch. Histology revealed a necrotic lesion between locally thickened articular cartilage and the subchondral bone, characteristic of osteochondrosis.

Reference: *Vet Rec.* 2005 Sep 24;157(13):383-386

IEWG or WSAVA

Certificate of radiological Elbow
Dysplasia examination

Examination based on International
Elbow Working Group Standards

Logo Kennel Club

Archive and
Registration
for Great Britain

Etc..Etc..

Registration .nr. Examination

ED-GB

National reg.veterinarian reg.nr. examiner

Animal

Name

Breed

Registration nr Tattoo

Microchip nr

Date of birth day month year

Sex F (female intact) FS (female spayed)
 M (male intact) Mc (male castrated)

Owner/agent

Name

Address

Country, Zip Town

The undersigned agrees to the WSAVA/IEWG examination protocol, the rules of the national scheme and confirms that the dog submitted for examination is the one described above. Signature also means that the results are available for official publication.

Signature owner / agent

Examination (veterinarian, age of dog, radiologic views)

Veterinarian

Name

Address

Country, Zip Town

Identification of dog

Check tattoo Correct Partly/unreadable Incorrect Absent

Check microchip Correct Incorrect Absent

Radiologic examination

Date radiologic examination day month year

Age Year Months

Number of radiographs per elbow 1 2 3 4 5

Radiologic projections ML-flexed (Medio-Lateral 45°-flexed) CC (Cranio-caudal) CC-15° pronated (Cranio-caudal-15° pronated)
 ML-neutral (Medio-Lateral 90°-ext.) ML-extended (Medio-Lateral >120°ext.) Other: (specify)

The undersigned agrees that the examination is performed according to protocols of the WSAVA (World Small Animal Veterinary Association) and her affiliate, IEWG (International Elbow Working Group).

Furthermore the undersigned states that the dog, submitted for IEWG-elbow-examination is the above mentioned dog. The results will be registered and archived by the National Kennel Club

Signature veterinarian

Results evaluation by National ED-panel

Veterinarian

Name

Address

Country, Zip Town

Radiographic evaluation

Date panel evaluation day month year

	Left elbow					Right elbow				
Primary lesion	UAP	FCP	OC	INC	Other	UAP	FCP	OC	INC	Other
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	← Affected →									
	← Suspected →									
	(No definite proof of a primary lesion) Free									
	(No sign of secondary arthrosis) Grade 0									
Secondary arthrosis						Borderline <input type="checkbox"/>				
						Grade I <input type="checkbox"/>				
						Grade II <input type="checkbox"/>				
						Grade III <input type="checkbox"/>				

The undersigned agrees that the radiographic evaluation is performed according to protocols of the WSAVA (World Small Animal Veterinary Association) and her affiliate, IEWG (International Elbow Working Group).

Signature authorized examiner

Interpretation

Interpretation based on the current recommendations of the International Elbow Working Group (IEWG), an affiliate of the World Small Animal Veterinary Association (WSAVA)

Primary Lesions
UAP Ununited Anconeal Process
FCP Fragmented Coronoid Process
OC Osteochondrosis or Osteochondritis dissecans of the medial humeral condyle
INC Incongruity of more than 2mm between articular surface of Radius and Ulna
Other Lesions Avulsion medial humeral epicondyle
Mineralisation medial collateral ligament/origin flexor muscles
Other:

ED grade, based on the secondary arthrosis © IEWG e.V.

Grade 0 No signs of arthrosis
BL Border Line: Undetermined changes
Grade 1 Osteophyte formation of less than 2 mm anywhere in the elbow joint
Grade 2 Osteophyte formation of 2-5 mm anywhere in the elbow joint
Grade 3 Osteophyte formation of more than 5 mm anywhere in the elbow joint

Note: The classification Grade 0 (or no detected primary lesion) does not imply that the animal is genetically sound. Based on the current scientific knowledge IEWG does not recommend breeding of arthrotic animals or animals displaying a primary lesion!

Space for sponsors !!!

International Elbow Working Group

The International Elbow Working Group [IEWG] was founded in 1989 by a small group of canine elbow experts from the USA and Europe to provide for dissemination of elbow information and to develop a protocol for screening that would be acceptable to the international scientific community and breeders.

The annual meeting is organized for the purpose of exchanging information and reviewing the Protocol. All interested persons are invited to attend the meeting and to participate in its activities.

The IEWG is an affiliate of the WSAVA.

IEWG meetings were held in

1989	Davis
1990	San Francisco
1991	Vienna
1992	Rome
1993	Berlin
1994	Philadelphia
1995	Konstanz
1996	Jeruzalem [cancelled]
1997	Birmingham
1998	Bologna
1999	Orlando
2000	Amsterdam
2001	Vancouver
2002	Granada
2003	Estoril Bangkok
2004	Rhodes
2005	Amsterdam Mexico Munich
2006	Prague
2007	Munich
2008	Dublin
2009	Sao Paulo
2010	Bologna
2011	Amsterdam

IEWG 2011

president	Herman Hazewinkel	H.A.W.Hazewinkel@uu.nl
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secretary	Thijs How	How@wxs.nl

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