

Gonioscopy – evaluation of the iridocorneal angle



presented (2017) & revised (2022) by Marianne Richter (HED committee chair)

HED committee:

- Proposal of a new grading system for gonioscopy (draft by M.Richter), presented in Budapest 2016, definitive since 2017
- *g*onioscopy sub-committee (2016):
 B. Ekesten, P. Bedford, C. Bundgaard, G.Chaudieu,
 A. Guandalini, M. Richter
- ["] Slides are kindly provided by B.Spiess

Gonioscopy – evaluation of the iridocorneal angle (ICA):

- Rational: From clinical observations the extent of PLA related to 360 angular degree of the ICA and the width of the ICA seem to be important concerning the likelihood to develop glaucoma.
- Grading of abnormalities of the iridocorneal angle (ICA) by evaluation of pectinate ligament (PL) and iridocorneal angle width (ICAW) over 360 degrees
- Identification/selection of dogs with abnormalities of the ICA potentially leading to blindness: severely affected dogs should be excluded from breeding

HED Manual: Definitions & Guidelines

Two predominant types of involvement of the angle are distinguished. The pectinate ligament (PL) and the iridocorneal angle (ICA) width are evaluated by gonioscopy in its extent of 360 degrees.

- Pectinate ligament abnormality (PLA): presumed hereditary eye disease; characterized by an abnormal PL that can be divided into 2 predominant types:
 - . Fibrae latae (FL) : fibres with a confluent (broad) base and shortened thin insertions at the cornea or thick fibres (<5 fibres)
 - Laminae (LA): plates or sheets of continuous tissue (>5 fibres), with or without flow holes
- Iridocorneal angle (ICA) width: the width of the ICA is evaluated by comparison of the length of the pectinate ligament (A) and the distance from the origin of the pectinate ligament to the anterior surface of the cornea at the transection area (B);

Gonioscopy – evaluation of the iridocorneal angle (ICA):

Grading of the pectinate ligament abnormality (PLA):

- 0 50% FL = unaffected
- >50-100% FL and/or < 25% LA = affected (mild)</p>
- 25-50% LA = affected (moderate)
- > 50% LA = affected (severe)

Grading of iridocorneal angle width (ICAwidth):



ECVO Certificate

In the area above for d abnormality: PLA (pect	lescrip tinate	bitive co ligame	omments ent abno	s, the exa rmality ar	miner specifies the nd/or ICA (iridocor	e type meal a	e of ICA angle)	A width	
Eve disease no					suture line tip suture line nuclear ring	erulent	ICA (width)	moderate severe narrow (m	oderate
Results for the known or presumed h	nereditary	veve diseas	ses (KP-HED):		Results valid for 12 mor	ths			
U	* NAFFECTED	** UNDETERMINED	* AFFECTED			WNAFFECTED	*** SUSPICIOUS	* AFFECTED	
1. Persistent Pupillary Membrane (PPM)				ris cornea ens l amina	11. Entropion / Trichiasis				
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				rade 1 rade 2 - 6	12. Ectropion / Macroblepharc	n 🗆			
3. Cataract (congenital)					13. Distichiasis / Ectopic cilia				
4. Retinal Dysplasia (RD)				multi)tocal jeographical otal	14. Corneal dystrophy				
5. Hypoplastic-/Micro-papilla				hereid hypenlesis	15. Cataract (non-congenital)				cortical post. pol.
6. Collie Eye Anomaly (CEA)				oloboma	16. Lens luxation (primary)				nuclear other
7. Other:				nild	17. Retinal degeneration (PRA				
8. IridoCorneal Angle Abnormality. (ICAA)	×			noderate	18. Other:				
Interpretation ** T Advantage: the exame *** T and its clinical impact	iner c t; con	learly	indicates nsible to	the seve the bree	rity of ICA abnorm der	ality i	n its e	ntirety	nce.
		Pi	resented (201	17) & revised (2022) by			C	

Definitions:

- **Normal PL:** thin/filamentous fibres from iris base to its insertion at the cornea
- Fibrae latae (FL) : fibres with a confluent (broad) base and shortened thin insertions at the cornea or thick fibres (<5 fibres)</p>





Definitions:

Laminae (LA): plates or sheets of continuous tissue (>5 fibres), with or without flow holes







Definitions:

*iridocorneal angle width (ICAwidth):*open – narrow – closed









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In the following example images, it is assumed that the image section is representative of 360 degrees of the iridocorneal angle



PLA: 0-50% FL around 360° = **unaffected ICAW:** open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



Marianne Richter

	ECV	O Cer	tificate		1	e este	Citrite .	T
Aignreye (OD)	Photo	post. lat.	Itemp. med./nas.		ant.	post	t. me	ed./nas. lat./temp.
Descriptive comments:				15. Catarac	ct other: punctata	8. ICA		- mild
					\ nuclear ring			- narrow (moderate)
Eye disease no.			severe		nuclear fiberglass/pulveru	ulent	(width)	closed (severe)
Results for the known or presumed			Ses (KP-HED):		Results valid for 12 month		*** SUSPICIOUS	* AFFECTED
1. Persistent Pupillary Membrane (PPM)				cornea	11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 			grade 1	-6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)					13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				phica	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla				hymonia	15. Cataract (non-congenital)			post. pol.
6. Collie Eye Anomaly (CEA)				nypop i asia na	16. Lens luxation (primary)			nuclear other
7. Other:					17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)	×		modera severe	te	18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
 ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
 *** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

FOR FUTHER INFORMATION: P.T.O.	Examiner	
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	Marianne Richter	14



PLA: 0-50% FL around 360° = unaffected ICAW: open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



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	ECV	O Cer	tifica	te			P		FI
Aight Bye (OD)	Photo	pographs:	temp.	med,/nas,		ant.	por	st. me	ed,/nas. lat,/temp.
Descriptive comments:				1	5. Catarac	t other: punctata	8. IC		— mild
								·	severe
Eye disease no.			🖂 sev	ere		nuclear ring nuclear fiberglass/pulv	erulent	ICA (width)	narrow (moderate) closed (severe)
Results for the known or presumed	heredita	ry eye diseas	ses (KP-HE	D):		Results valid for 12 mon	ths ,	***	*
ι	NAFFECTED	UNDETERMINED	AFFECTED		_		UNAFFECTED	SUSPICIOUS	AFFECTED
1. Persistent Pupillary Membrane (PPM)				liris	cornea	11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				grade 1 grade 2-6		12. Ectropion / Macroblepharo	n 🗆		
3. Cataract (congenital)				/multi)feed		13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				geographica	al	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla				lola	aplasia	15. Cataract (non-congenital)			cortical post. pol.
6. Collie Eye Anomaly (CEA)				coloboma	oopiasia	16. Lens luxation (primary)			nuclear other
7. Other:				mild		17. Retinal degeneration (PRA			
8. IridoCorneal Angle Abnormality. (ICAA)	*			moderate severe		18. Other:			

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PLA: 0-50% FL around 360° = **unaffected ICAW:** open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	O Cer	tificate	9	Strand a			
Aight eye (OD)	Photo	post. lat.	temp. med.	/nas.	ant.			
Descriptive comments:				15, Catarac	t other: punctata	8. IC/		— mild
								severe
					\ nuclear ring			- narrow (moderate)
Eye disease no.			severe		nuclear fiberglass/pulver	ulent	(width)	closed (severe)
Results for the known or presumed l	heredita	ry eye diseas	ses (KP-HED):		Results valid for 12 montl	าร	***	*
U	NAFFECTED	UNDETERMINED	AFFECTED		U	NAFFECTED	SUSPICIOUS	AFFECTED
1. Persistent Pupillary Membrane (PPM)				iscornea ens l amina	11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 			g g	rade 1 rade 2 - 6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)				multi)focal	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				eographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla				horoid hynonlasia	15. Cataract (non-congenital)			post. pol.
6. Collie Eye Anomaly (CEA)				oloboma ther:	16. Lens luxation (primary)			nuclear other
7. Other:				ni l d	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)	×			noderate evere	18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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 *** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

FOR FUTHER INFORMATION:	P.T.O.	Examiner	
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PLA: 0-50% FL around 360°= **unaffected ICAW:** open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



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- * "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
- ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
- *** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

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	Marianne Richter	20



PLA: >50-100% FL and/or <25% LA = affected – mild ICAW: open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea





* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.

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	Marianne Richter	22



PLA: 0-50% FL around 360°= unaffected ICAW: open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	0 Cer	tifica	ate		that per	HIT IS
Aight eye (OD)	Photo	graphs:	/temp.	med./nas.	ant.	post.	med_/nas. lat./temp.
Descriptive comments:				15. Catara	act other: punctata	8. ICAA: PLA	mild
					suture line		severe
					nuclear ring	ICA (wis	narrow (moderate)
Eye disease no.			. 🗆 se\	vere	I nuclear fiberglass/pulverul	lent (wid	(severe)
Results for the known or presumed	NAFFECTED	y eye disea	Ses (KP-HE	ED):	Results valid for 12 months	S * *** AFFECTED SUSPICIO	* DUS AFFECTED
1. Persistent Pupillary Membrane (PPM)				iris cornea	11. Entropion / Trichiasis		
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				grade 1 grade 2-6	12. Ectropion / Macroblepharon		
3. Cataract (congenital)				(multi)fe cel	13. Distichiasis / Ectopic cilia		
4. Retinal Dysplasia (RD)				geographical	14. Corneal dystrophy		
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)		cortical post. pol.
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)] nuclear other
7. Other:				mild	17. Retinal degeneration (PRA)		
8. IridoCorneal Angle Abnormality. (ICAA)	×			moderate severe	18. Other:		

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence. ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive. *** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

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		Marianne Richter	24



PLA: 0-50% FL around 360°= unaffected ICAW: open

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	O Cer	tificate	2	1000			
Algint eye (OD)	Phote	pographs:	/temp. med./	mas,	ant.	post	med	Hunas, Lat./temp.
Descriptive comments:				15. Catarac	t other: punctata	8. ICAA:		mild moderate
					suture line			severe
Eve disease no.			severe		nuclear ring	ulent	ICA (width)	narrow (moderate)
Results for the known or presumed	heredita	ry eye disea:	ses (KP-HED):		Results valid for 12 month	าร		
	* UNAFFECTED	** UNDETERMINED	* AFFECTED		UI	*	*** SPICIOUS	* AFFECTED
1. Persistent Pupillary Membrane (PPM)				s cornea	11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				ade 1 ade 2 - 6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)				ulti)focal	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				eographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla				oroid, hypoplasia	15. Cataract (non-congenital)			post. pol.
6. Collie Eye Anomaly (CEA)				loboma her:	16. Lens luxation (primary)			nuclear other
7. Other:				ild	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)				oderate evere	18. Other:			

Interpretation

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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FOR FUTHER INFORMATION: P	P.T.O.	Examiner	
	I	Presented (2017) & revised (2022) by	20
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PLA: 0-50% FL around 360°= unaffected ICAW: narrow = affected – moderate? or ICAW: open = unaffected? Comment: if the ICAW appears narrow, the position of the gonio lens must be checked and, if necessary, moved with a finger until the iridocorneal angle can be viewed and judged clearly.

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



Presented (2017) & revised (2022) by Marianne Richter

	ECV	0 Cer	tificat	te				
Algin Bye (OD)	Photo	graphs:	/temp. m	ed./nas.	ant.	post.	mer	d_/nas. lat./temp.
Descriptive comments:				15. Catarac	t other: punctata	8. ICAA		— mild
					suture line			severe
					nuclear ring			- narrow (moderate)
Eye disease no.				re	nuclear fiberglass/pulven	ulent	(width)	Closed (severe)
Results for the known or presumed	NAFFECTED	v eye disea: ** UNDETERMINED	SES (KP-HED):	Results valid for 12 month	NAFFECTED SI	*** USPICIOUS	* AFFECTED
1. Persistent Pupillary Membrane (PPM)]iriscornea]lenslamina	11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV)]grade 1]grade 2 - 6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)				(multi)faad	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)] (multi)local] geographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)			cortical post. pol
6. Collie Eye Anomaly (CEA)] coloboma] coloboma	16. Lens luxation (primary)			nuclear other
7. Other:] mild	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)	>] moderate] severe	18. Other:			

Interpretation

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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PLA: 25-50% LA (around 360°) = affected – moderate ICAW: open

Comment: in areas of LA the ICAwidth may be narrow... however, the ICAwidth is judged over 360 degrees!

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



Presented (2017) & revised (2022) by Marianne Richter

	ECV	0 Cer	tifica	ate			
Algint eye (OD)	Photo	graphs:	/temp.	med./nas,	ant	post.	med_/nas. lat,/temp.
Descriptive comments:				15. Catara	act other: punctata	8. ICAA: PLA	mild
							severe
					\ nuclear ring	ICA	narrow (moderate)
Eye disease no.			sev	vere	nuclear fiberglass/pulverul	lent (wid	ith) closed (severe)
Results for the known or presumed				ED):	Results valid for 12 months	S * *** AFFECTED SUSPICI	OUS AFFECTED
1. Persistent Pupillary Membrane (PPM)				iris cornea	11. Entropion / Trichiasis		
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				grade 1 grade 2-6	12. Ectropion / Macroblepharon		
3. Cataract (congenital)				(and bi)fe and	13. Distichiasis / Ectopic cilia		
4. Retinal Dysplasia (RD)				geographical	14. Corneal dystrophy		
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)		cortical
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)] nuclear
7. Other:				mild	17. Retinal degeneration (PRA)		
8. IridoCorneal Angle Abnormality. (ICAA)				moderate severe	18. Other:		

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PLA: 25-50% LA (around 360°) = affected – moderate ICAW: open

- A = length of PL
- B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	0 Cer	tificat	е		NCC.	2	
Algin eye (OD)	Photo	graphs:	/temp. me	d,/nas,	ant.	post.	me	d./nas. lat./temp.
Descriptive comments:				15, Catarac	t other: punctata	8. ICAA		- mild
					suture line			severe
					nuclear ring	ulant	ICA (width)	- narrow (moderate)
Eye disease no.	h a va dit a v			e	Descrifte und lied fore 40 means f	ulent	(main)	Closed (severe)
Results for the known or presumed	NAFFECTED	y eye disea ** UNDETERMINE	SES (KP-HED * AFFECTED):	Results valid for 12 monti	NAFFECTED S	*** USP ICI OUS	* AFFECTED
1. Persistent Pupillary Membrane (PPM)				iris cornea	11. Entropion / Trichiasis			
 Persistent Hyperpl. Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				grade 1 grade 2-6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)				(13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				geographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)			
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)			nuclear other
7. Other:				mi l d	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)			××	moderate severe	18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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	Marianne Richter	32



PLA: >50% LA (around 360°) = affected
- severe
ICAW: open

- A = length of PL
- B = distance from the origin of the PL to the anterior surface of the cornea



l	ECV	O Cer	tifica	ate				
Alight eye (OD)	Phote	post. lat.	temp.	med./nas,	ant.	pos	t. me	d./nas. lat./temp.
Descriptive comments:				15, Catarac	t other: punctata	8. IC/		— mild
					suture line		`	severe
Eve disease no				Vere	│	erulent	ICA (width)	- narrow (moderate)
Results for the known or presumed	heredita	ry eye diseas	ses (KP-H	ED):	Results valid for 12 mon	ths		
U	*	** UNDETERMINED	AFFECTED			UNAFFECTED	*** SUSPICIOUS	* AFFECTED
1. Persistent Pupillary Membrane (PPM)				iris cornea	11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				grade 1 grade 2-6	12. Ectropion / Macroblepharo	n 🗆		
3. Cataract (congenital)				(multi)fecel	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				geographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)			post. pol
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)			nuclear other
7. Other:				mi l d	17. Retinal degeneration (PRA	<i>۱</i>) 🗆		
8. IridoCorneal Angle Abnormality. (ICAA)				moderate	18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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PLA: > 50% LA (around 360°) = affected – severe ICAW: open

Comment: ICAwidth = open but occluded by LA (note the difference between the terms "closed" and "occluded");

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	O Cer	tifica	ate				
Aight eye (OD)	Photo	post. lat.	/temp.	med./nas.	ant.	post.	me	d./nas. lat./temp.
Descriptive comments:				15. Catarac	ct other: punctata	8. ICAA		— mild
					suture line			severe
Eye disease no.			. 🖂 se	vere	nuclear ring	ulent	ICA (width)	- narrow (moderate)
Results for the known or presumed	heredita	ry eye disea:	ses (KP-HI	ED):	Results valid for 12 month	າຣ *	***	*
			AFFECTED	iris cornea		AFFECTED S	USPICIOUS	AFFECTED
1. Persistent Pupillary Membrane (PPM)				lens lamina	11. Entropion / Trichlasis			
2. Persistent Hyperpl. Lunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV)				grade 1 grade 2-6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)				(multi)feeol	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				geographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)			cortical
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)			nuclear other
7. Other:				mi l d	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)				moderate severe	18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
 ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
 ** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

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Marianne Richter



PLA: > 50% LA (around 360°) = affected – severe ICAW: open

Authors interpretation: ICA occluded by a sheet of pigmented tissue spanning the angle from the base of the iris to the inner-pigmented band with one flow hole visible (>90% affected).

"Progression of pectinate ligament dysplasia over time in two populations of Flat-Coated Retrievers" R.Pearl, D.Gould, B.Spiess *Veterinary Ophthalmology*, Vol18, Issue 1, p 6-12, Sep 2013

- A = length of PL
- B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	O Cer	tificate	2		-	-10	
ant.	Photo	post.	/temp. med./	nas.	ant.	post.	med./I	has. lat./temp.
Descriptive comments:				15. Catarac	t other: punctata	8. ICAA:		mild moderate
					suture line			severe
Eye disease no.			. 🖂 severe		nuclear ring	ulent	ICA [(width)	narrow (moderate)
Results for the known or presumed	heredita	ry eye disea	ses (KP-HED):		Results valid for 12 month	າຣ *	***	*
1 Dereistent Durillen/ Membrane (2010)			D AFFECTED	s cornea	Ut	AFFECTED SU	SPICIOUS A	AFFECTED
2. Persistent Hyperpl.Tunica Vasculosa				ns la mina ade 1	12 Ectropion / Macrohlenharon			
Lentis/Primary Vitreous (PHTVL/PHPV)			gr	ade 2-6				
4. Betinel Dueplasia (DD)				ulti)focal				
4. Retinal Dysplasia (RD)				ographical tal	14. Corneal dystrophy			cortical
5. Hypoplastic-/Micro-papilla			ch	oroid, hypop l asia	15. Cataract (non-congenital)			post. pol
6. Collie Eye Anomaly (CEA)				oboma	16. Lens luxation (primary)			other
7. Other:				d	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)				oderate vere	18. Other:			

- * "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
 ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
 *** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

FOR FUTHER INFORMATION: P.T.O.	Examiner	
	Presented (2017) & revised (2022) by	20
	Marianne Richter	39



PLA: > 50% LA (around 360°) = affected – severe ICAW: open

Authors interpretation: ICA occluded by a sheet of pigmented tissue spanning the angle from the base of the iris to the inner-pigmented band with several flow holes visible (70% affected).

"Progression of pectinate ligament dysplasia over time in two populations of Flat-Coated Retrievers" R.Pearl, D.Gould, B.Spiess *Veterinary Ophthalmology*, Vol18, Issue 1, p 6-12, Sep 2013

- A = length of PL
- B = distance from the origin of the PL to the anterior surface of the cornea



Presented (2017) & revised (2022) by Marianne Richter

	ECV	O Cer	tifica	te				Thatman
ant.	Photo	post.	/temp.	med./nas.	ant.	post.	mec	d./nas. lat./temp.
Descriptive comments:				15. Catarac	t other: punctata	8. ICAA		– mild
					suture line		\	severe
Eye disease no.			. 🖂 seve	ere	nuclear ring	ulent	ICA (width)	narrow (moderate)
Results for the known or presumed	heredita	y eye disea	ses (KP-HE	D):	Results valid for 12 month	IS .	***	
u	INAFFECTED	UNDETERMINED	AFFECTED		UN	AFFECTED SU	JSPICIOUS	AFFECTED
1. Persistent Pupillary Membrane (PPM)					11. Entropion / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 				grade 1 grade 2 - 6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)				multilfocal	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				geographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)			cortical post. pol.
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)			nuclear other
7. Other:				other:	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)				moderate	18. Other:			

- * "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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Gonioscopy: the slide shows a **single abnormal area**, the rest of the ICA looks normal.

PLA: >50-100% FL and/or < 25% LA = affected – mild ICAW: open

- A = length of PL
- B = distance from the origin of the PL to the anterior surface of the cornea



Marianne Richter

ECVO Certificate

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	Gon abn norr	iiosco orma mal.	py: th l area	e slide , the re	show est of t	s a single the ICA looks	میں میں ا		
ant.	pos	st. at./	temp.	med,/nas,		ant.	q	ບຣເ. ເ	neo,/nas, jat,/temp,
Descriptive comments:					15. Catarac	t other: punctata suture line tip suture line nuclear ring	8. I	ICAA: PLA	mild moderate severe narrow (moder:
Eve disease no.				evere		nuclear fibergla	iss/pulverulent	(width)	closed (severe)
Results for the known or presumed h	nereditary e	ve diseas	es (KP-F	IED):		Results valid for 12	months		
	* NAFFECTED UN	** DETERMINED	* AFFECTED).			WNAFFECTE	D SUSPICIOUS	* AFFECTED
1. Persistent Pupillary Membrane (PPM)				iris I ens	cornea amina	11. Entropion / Trichiasis			
 Persistent Hyperpl. Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 			\square	grade 1	6	12. Ectropion / Macroble	pharon 🗆		
3. Cataract (congenital)						13. Distichiasis / Ectopic	cilia 🗆		
4. Retinal Dysplasia (RD)			\leq	(multi)foo	nical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					hypop l asia	15. Cataract (non-conge	nital) 🗆		post
6. Collie Eye Anomaly (CEA)			\leq		a	16. Lens luxation (prima	ry) 🗆		nucle
7. Other:				mild		17. Retinal degeneration	(PRA)		
8. IridoCorneal Angle Abnormality. (ICAA)			×	moderate	e	18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.

** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
 *** The animal displays minor, but specific clinical signs of the KP-HED mentioned. Further development will confirm the diagnosis. Reexamination inmonths.

FOR FUTHER INFORMATION:	P.T.O.	Examiner	
		Presented (2017) & revised (2022) by	12
		Marianne Richter	43



PLA: > 50% LA = affected – severe ICAW: open

- A = length of PL
- B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	O Cer	tific	ate						7.200
Right Bye (OD)	Photo	bgraphs:								
ant. Descriptive comments:		post. at.	/temp.	med./nas.	15. Catarac	ant. t other:] punctata	post 8. ICA	4: PLA	1./nas. lat./temp.
							suture line tip		\backslash	moderate
] suture line] nuclear ring			 severe narrow (moderate)
Eye disease no.			. 🗆 s	evere] nuclear fiberglass/pulv	erulent	(width)	Closed (severe)
Results for the known or presumed	heredita	ry eye disea	ses (KP-H	HED):		Results	valid for 12 mon	ths	***	*
ι.		UNDETERMINE	AFFECTED	inia				UNAFFECTED	SUSPICIOUS	AFFECTED
1. Persistent Pupillary Membrane (PPM)			\square		lamina	11. Entropio	on / Trichiasis			
 Persistent Hyperpl.Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV) 			\square	grade 1	6	12. Ectropio	n / Macrob l epharo	n 🗆		
3. Cataract (congenital)				/multi)fo		13. Distichia	asis / Ectopic cilia			
4. Retinal Dysplasia (RD)			\leq		hica	14. Corneal	dystrophy			
5. Hypoplastic-/Micro-papilla				total	hum an t a a la	15. Catarac	t (non-congenital)			cortical post. pol.
6. Collie Eye Anomaly (CEA)			\triangleleft		nypop i asia a	16. Lens lux	(ation (primary)			nuclear other
7. Other:				other:		17. Retinal of	degeneration (PRA			
8. IridoCorneal Angle Abnormality. (ICAA)	_		×	moderat	e	18. Other:				

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 ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
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	Marianne Richter	45



PLA: PL not visible
ICAW: PL not visible = closed =
affected - severe

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



	ECV	O Cer	tific	ate					
Aight eye (OD)	Photo	post.	Jtemp.	med./nas,		ant.			
Descriptive comments:					15. Catarac	t other: punctata	8. IC		
						suture line			severe
Eye disease no.			🗆 s	evere		nuclear ring	/erulent	ICA (width)	
Results for the known or presumed	hereditar	y eye disea	ses (KP-H	IED):		Results valid for 12 mor	nths _	***	*
	INAFFECTED		D AFFECTED	1 liris [cornea		UNAFFECTED	SUSPICIOUS	AFFECTED
1. Persistent Pupillary Membrane (PPM)					lamina	11. Entropion / Trichiasis			
2. Persistent Hyperpi, Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV)			\square	grade 1 grade 2-6	;	12. Ectropion / Macroblephare	n 🗆		
3. Cataract (congenital)				(multi)foc	al	13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)			\triangleleft	geograph	ica	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					vnonlogio	15. Cataract (non-congenital)			cortical post. pol
6. Collie Eye Anomaly (CEA)			\triangleleft		iypop i asia I	16. Lens luxation (primary)			nuclear other
7. Other:				otner:		17. Retinal degeneration (PR	A)		
8. IridoCorneal Angle Abnormality. (ICAA)			≍	moderate		18. Other:			

* "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
 ** The animal displays clinical features that could possibly fit the KP-HED mentioned, but the changes are inconclusive.
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FOR FUTHER INFORMATION: P.T.O.	Examiner	
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	Marianne Richter	47



PLA: 0 – 50% FL = unaffected ICAW: narrow = affected – moderate

A = length of PL

B = distance from the origin of the PL to the anterior surface of the cornea



Presented (2017) & revised (2022) by Marianne Richter

	ECV	O Cer	tifica	te	and the second	1		
Aight eye (OD)	Photo	post. lat.	/temp. n	ned./nas.	ant.	post.	me	ed_/nas. lat,/temp.
Descriptive comments:				15. Catar	act other: punctata	8. ICA		— mild
					suture line			
					\ nuclear ring			narrow (moderate)
Eye disease no.			seve	ere	nuclear fiberglass/pulve	rulent	(width)	closed (severe)
Results for the known or presumed		y eye diseas		D):	Results valid for 12 mont	hs *	***	*
1. Persistent Pupillary Membrane (PPM)					11. Entropion / Trichiasis			
2. Persistent Hyperpl Tunica Vasculosa Lentis/Primary Vitreous (PHTVL/PHPV)				_uens ∟_uamina]grade 1]grade 2-6	12. Ectropion / Macroblepharon			
3. Cataract (congenital)					13. Distichiasis / Ectopic cilia			
4. Retinal Dysplasia (RD)				_ (multi)focal] geographical	14. Corneal dystrophy			
5. Hypoplastic-/Micro-papilla					15. Cataract (non-congenital)			cortical post. pol
6. Collie Eye Anomaly (CEA)				coloboma	16. Lens luxation (primary)			nuclear other
7. Other:				_ oaler. ⊐ mild	17. Retinal degeneration (PRA)			
8. IridoCorneal Angle Abnormality. (ICAA)				moderate severe	18. Other:			

- * "Unaffected" signifies that there is no clinical evidence of the known or presumed hereditary eye diseases (KP-HED) specified, whereas "affected" signifies that there is such evidence.
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FOR FUTHER INFORMATION: P.T.O.	Examiner	
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	Marianne Richter	49

Chapter 8 Vet Advice:

- Gonioscopy every 3 years /at age 1, 4 & 7 (Chapter 7 Recommendations regarding age and frequency)
- **Breeding advice (ICA = iridocorneal angle abnormality):**
 - . Mild-moderate: OPTIONAL (according to present scientific information available: if these dogs are used, it is recommended to breed these dogs to unaffected graded dogs)
 - . Severe: NO BREEDING (+ risk to develop glaucoma)