

LENS LUXATION IN DOGS / PLL

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Lens luxation in dogs is a condition in which the lens is completely released from its physiological position and displaced either forward (into the anterior chamber) or backward (into the vitreous body). The cause of the disease is the disruption of the support ligaments responsible for fixing the lens. It is a serious, often very painful disease leading to blindness.

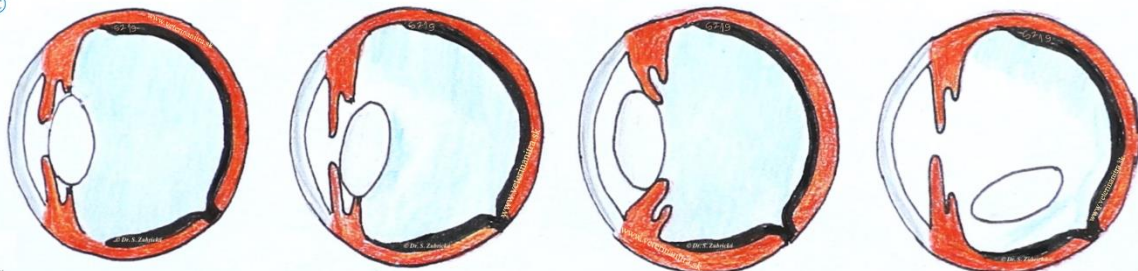
LENS

The lens is a flattened transparent component of the eye which, together with the cornea, is involved in focusing the light beam on the retina. Its main function is accommodation (the ability of the eye to see different distant objects sharply).

The lens is located in the so-called hyaloid fossa (a depression on the anterior surface of the vitreous body), behind the iris. It is fixed to the ciliary body with the so-called zonular fibres, ensuring its firm anchoring. The most common lens diseases affecting dogs include lens luxation/subluxation and cataract.

TYPES OF LENS LUXATION IN DOGS

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Šošovka vo fyziologickej polohe

Lens at the physiological position

Subluxácia šošovky

Lens subluxation

Predná luxácia šošovky

Anterior lens luxation

Zadná luxácia šošovky

Posterior lens luxation

Lens luxation itself in a dog can be preceded by subluxation. In this case, there is only a partial separation of the lens and the lens remains in its normal position or is only partially dislocated from it. The zonular fibres in such a case are not completely ruptured.

Lens luxation in dogs represents complete dislocation of the lens from the hyaloid fossa either into the anterior chamber in front of the iris (*anterior lens luxation*) or posteriorly into the vitreous body (*posterior lens luxation*). Anterior luxation in particular causes serious problems, where the lens comes forward and blocks the fluid from draining out of the eye and leads to increased intraocular pressure and other complications. This is an extremely painful condition leading to blindness. It usually develops very quickly and prompt diagnosis and treatment is also necessary for its successful management.

Lens luxation in dogs can be characterized not only by the location of the dislocated lens, but also by its cause. In *primary lens luxation*, the zonular fibres responsible for fixation of the lens are weakened and ruptured due to [hereditary factors](#). The inheritance of the disease is considered to be autosomal recessive.

Dog breeds in which a hereditary factor has been demonstrated include, primarily, terriers. With the identification of the mutation in the ADAMTS17 gene responsible for the disease, also DNA testing for breeders of certain breeds (American Eskimo, Australian Cattle Dog, Australian Kelpie, Border Collie, American Toy Fox Terrier, Chinese Crested Dog, Chinese Foo Dog, Wire Fox Terrier, Jack Russell Terrier, Hunting Terrier, Yorkshire Terrier, Lancashire Heeler, Lakeland Terrier, Miniature Bull Terrier, Parson Russel Terrier, Patterdale Terrier, Rat Terrier, Sealyham Terrier, Italian Greyhound, Tenterfield Terrier, Tibetan Terrier, Volpino, Welsh Terrier) is possible.

However, inheritance of the disease has been suggested in many other breeds, such as the Brittany, Shar-Pei, Cairn Terrier, Manchester Terrier, Scottish Terrier, Sky Terrier, West Highland White Terrier, and others.



*A



*B



*C



*D

In addition, there is another group of breeds in which inheritance has not been confirmed but which have an increased predisposition to develop lens luxation (e.g. German Shepherd Dog, Australian Shepherd Dog, Basset Hound, Chihuahua, Greyhound, Miniature Poodle, Pembroke Welsh Corgi, etc.). In some breeds, lens luxation can occur concurrently with primary glaucoma.

Secondary lens luxation can be induced, for example, by a punch or kick to the eye area, chronically elevated intraocular pressure, uveitis or intraocular tumours; however the disruption of the zonular fibres can also occur in cataract.

CLINICAL SYMPTOMS

In lens luxation, symptoms, such as fine iris trembling (iridodonesis), lens shaking (phacodonesis), change in anterior chamber depth, aphakic sickle, syneresis of the vitreous body, diffuse blepharospasm, epiphora, photophobia, conjunctival hyperaemia, corneal swelling and opacification, and severe eye pain, can be observed. The condition may lead to the development of uveitis, [glaucoma](#) (however, glaucoma may be not only a consequence but also a cause of lens luxation), retinal detachment, hyphema and cataract. Gradually, vision deteriorates and the condition can progress to [blindness](#).

DIAGNOSIS

Diagnosis is based on medical history and a thorough ophthalmological examination of the anterior and posterior segments of the eye using several examination methods (tonometry, gonioscopy, direct and indirect ophthalmoscopy, eye ultrasound). In some cases, diagnosis is difficult or even impossible due to corneal oedema. It develops as a result of glaucoma and makes it impossible to assess the deeper structures of the eye.

TREATMENT

The choice of treatment depends on whether it is a subluxation or luxation, what the position of the luxated lens (anterior/posterior) is, what the cause is (primary/secondary), but also how long the condition lasts and what other symptoms have developed.

In the case of anterior lens luxation, it is best to perform surgical removal of the lens as soon as possible after dislocation with the aid of a surgical microscope. Posterior lens luxation usually does not cause serious problems, and only pharmacological therapy is used.

In the presence of glaucoma, treatment should focus on reducing the intraocular pressure and bringing it under control. In severe conditions, irrespective of the type of luxation, enucleation of the eye is performed. The success rate of treatment (both pharmacological and surgical) depends on how early the disease is detected and treated.

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A - Czechoslovakian Wolfdog with bilateral posterior lens luxation. The condition is combined with glaucoma and progressive retinal atrophy (PRA). Picture: Dr. P. Zubrický;

B - Posterior lens subluxation in the 7-year-old Shar Pei. Picture: Dr. P. Zubrický

C - Luxácia šošovky do predného... - Anterior lens luxation in the 7-year-old Prague Ratter. Picture: Dr. P. Zubrický

D - Anterior lens luxation in the 7-year-old Pragua Ratter, the condition combined with cataract. Picture: Dr. P. Zubrický

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Heredity - Statistical assumption			
X	Male affected	Male carrier	Male free
Female affected POAG-PLL/POAG-PLL	100% affected	50% affected 50% carrier	100% carrier
Female carrier POAG-PLL/N	50% affected 50% carrier	25% free 25% affected 50% carrier	50% carrier 50% free
Female free N/N	100% carrier	50% free 50% carrier	100% free