Genetic analysis of patellar luxation in dogs

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Patellar luxation

Not only dogs - frequently found in cattle, sheep, horses..

One of the most common orthopedic diseases in dogs

Pain and lameness

Small dogs are more likely to develop patellar luxation - need for treatment increase with severity and size of the dog
Diagnosis

Palpation of the joint

The dog at least 1 year of age

Grading on scale 0-3:

Illustration adapted from: http://www.lowchensaustralia.com/health/patella.htm
Health program

Recorded by the Swedish Kennel Club as part of central screening program for diseases

Some breeds with mandatory requirement to screen all breeding animals

No restriction based on screening result – only known status required
Aim of study

Evaluate the effect of the current genetic health program for patellar luxation

To estimate genetic parameters and trends

Two breeds: Bichon Frise and Chihuahua
## Data

<table>
<thead>
<tr>
<th>Bichon Frise</th>
<th>Chihuahua</th>
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<tbody>
<tr>
<td>• 1036 records (1997-2012)</td>
<td>• 7024 records (1999-2012)</td>
</tr>
<tr>
<td>• 20% of registered dogs</td>
<td>• 38% of registered dogs</td>
</tr>
<tr>
<td>• Health program from 2005</td>
<td>• Health program from 2009</td>
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Prevalence

% of examined dogs

Degree of luxation

Bichon Frise
Chihuahua
Genetic analysis

Dogs were defined as affected or unaffected (0 or 1)

Mixed linear animal model, using DMU

Model:

Patellar luxation = sex + age + vet + animal + e
Effect of age at examination
Effect of sex

Higher risk for females

Odds ratio females/males:  Chihuahua 1.2
                          Bichon Frise 4.3
Genetic analysis - results

Estimated heritabilities of 0.18 (Bichon) and 0.22 (Chihuahua)
Phenotypic trend

% PL affected dogs

Birth year

Bichon Frise
Chihuahua
Genetic trend

Standardised average EBV

Birth year

Bichon Frise
Chihuahua
Summary of results

Moderate heritabilities

Chihuahua had higher prevalence and more severe cases

Females more affected, especially in Bichon Frise

Proportion of affected dogs increased with age
Conclusion

Patellar luxation is a heritable disease in Swedish Bichon Frise and Chihuahua

Current health programs would benefit from EBVs

Dogs should be examined later in life