**DIAGNOSIS OF CRYPTORCHIDISM**

Cryptorchidism (or retention of a testis) is of importance because of associated unwanted stallion-like behaviour. Bilateral cryptorchids are usually infertile and unilateral cryptorchids have reduced sperm production. The Leydig cells of retained testicles remain capable of testosterone production and cryptorchids therefore exhibit stallion-like behaviour. Retained testicles may be at increased risk of becoming neoplastic in horses as they are in man. The condition is likely to be hereditary though there is conflicting information over the likely genetic mechanism. The mode of inheritance may even be different between stallions as some have a high incidence of cryptorchid foals whilst others do not. Percherons, Quarter Horses and cross-bred horses or ponies may have a higher incidence of cryptorchidism than other breeds, whilst Thoroughbreds, Arabs, Standardbreds and Morgans may be less likely to be affected.

- Testicles should descend by 2 weeks of age but may, rarely, descend up to 12 months of age
- Failure of descent of right and left testicles occurs with equal frequency overall.
- In young ponies retention of the right testicle is most common.
- In horses, retention if the left testicle is more common
- The right testicle is more likely to be retained in the inguinal region (60% vs 40% in the abdomen)
- The left is more likely to be retained in the abdomen (75% vs 25% in the inguinal region).
- Inguinally retained testicles may (rarely) descend into the scrotum up to 3 years of age.
- One in 10 horses with retained testicles have the condition bilaterally. Where the condition is bilateral, both testicles are usually retained at the same site; two thirds being intra-abdominal and the remaining third being inguinal.
- Cryptorchidism may on very rare occasions (1 in 500) be a sign of intersexuality.
- Anorchidism or monorchidism are exceedingly rare
- Stallion-like behaviour may be observed in up to 20% of normal geldings and is not necessarily an indication of cryptorchidism

**Physical Examination**

Diagnosis can often be made from careful examination especially if the animal’s history is known:

- Careful palpation of the scrotum and inguinal region. Beware palpation in foals as the gubernaculum is relatively large and may be mistaken for a testicle. Palpation is facilitated by sedation.
- Rectal palpation or transrectal ultrasound of the retained testicle
- With an experienced ultrasonographer transrectal ultrasonography is a very accurate means of diagnosis

If testes are not palpable and the animal’s history is uncertain then the presence of retained testicular tissue may be evaluated by hormone assays. Concentrations of testosterone and oestrone sulphate start to decrease rapidly after castration but may continue to decrease for up to 6 weeks.

**Serum Oestrone Sulphate**

In horses over 3 years of age measurement of serum oestrone sulphate concentration is a reliable indicator of the presence of testicular tissue. In younger animals and in donkeys, cryptorchids do not reliably produce sufficient oestrone sulphate so whilst a positive result is informative, a negative result does not rule-out the possibility of retained testicular tissue. When used in older horses and ponies the test is 96% accurate in determining the presence of retained testicular tissue.

**Expected Serum Oestrone Sulphate Concentrations:**

<table>
<thead>
<tr>
<th>Status</th>
<th>Serum Oestrone Sulphate Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gelding</td>
<td>&lt; 0.02 ng/ml</td>
</tr>
<tr>
<td>Cryptorchid</td>
<td>0.1 - 10 ng/ml</td>
</tr>
<tr>
<td>Stallion</td>
<td>&gt; 10 ng/l</td>
</tr>
</tbody>
</table>

For results between 0.05 and 1 ng/ml further testing with a human chorionic gonadotrophin (hCG) stimulation test is recommended.
**Resting Testosterone Concentration**

In animals under 3 years of age, serum testosterone concentration may be measured. However, resting testosterone levels vary markedly between individuals, vary with age and fluctuate with season. There is therefore the potential for overlap between horses with and without testicular tissue with rates of misdiagnosis being up to 14% using this measurement alone. This test is not recommended as measurement following hCG stimulation is more reliable.

**hCG Stimulation Test**

The number of equivocal results is reduced by measurement of testosterone following injection of human chorionic gonadotrophin (Chorulon, Intervet). This test is recommended for all horses under 3 years of age, for all donkeys and for horses or ponies in which the results of oestrone sulphate measurement is equivocal.

1. Measure serum testosterone concentration
2. Administer 6000u human chorionic gonadotrophin IV
3. Re-measure serum testosterone concentration 24 hours later. Serum testosterone will be increased from 30 minutes to 48 hours after injection of hCG so timing of the follow-up sample is not critical.

<table>
<thead>
<tr>
<th>Neutered Male</th>
<th>Resting Testosterone (nmol/L)</th>
<th>Testosterone post hCG (nmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gelding</td>
<td>&lt;0.15</td>
<td>&lt;0.2</td>
</tr>
<tr>
<td>Cryptorchid</td>
<td>0.3 - 4.3</td>
<td>1 - 13</td>
</tr>
<tr>
<td>Stallion</td>
<td>5 - 30</td>
<td></td>
</tr>
</tbody>
</table>