

Critical appraisal – Standard questions

Witte et al. 2016

Introduction	
Are the aims clearly stated?	In the methods, the authors state they are using an observational case-control study to compare racing outcomes in a population of National Hunt racehorses in the Republic of Ireland. In the abstract, the aim is to compare race outcomes after commonly advocated treatments for tendon healing. Several hypotheses are listed in the introduction.
Methods	
Is the study design suitable for the aims?	This study is described by the authors as a case control study. However, considering the aims and hypotheses, the study also features aspects of cohort or case series studies. Therefore standard questions have been used to appraise this study.
What population of animals was being studied?	<p>National Hunt racehorses in the Republic of Ireland that presented to a single veterinary clinic between June 2007 and July 2011 with superficial digital flexor tendon (SDFT) injuries.</p> <p>These horses were treated for SDFT injury with one of: controlled exercise; or recommended controlled exercise plus bar firing, platelet rich plasma injection or tendon splitting; tendon splitting in combination with bar firing.</p> <p>Two age and sex matched controls were also included per injured horse to allow comparison between injured and non-injured horses. These horses: had competed against an injured horse in the horse's last race before presentation to the clinic for evaluation of an SDF tendon injury (selected by random number generator) OR were the closest available match (method not further described) OR if the injured horse had not raced, the control was selected from its first race after treatment.</p>

<p>Is it clear what measurements were carried out in the study?</p>	<p>Data collected: Age; sex; horse origin (ex-store, ex-flat, point-to-point); treatment; lesion severity (taken from ultrasonic cross sectional measurements at the zone of maximum injury – either mild, moderate or severe); number of days to first race after injury; minimum, median and maximum intervals between all races post-injury.</p> <p>In addition, the following data were obtained from the Racing Post: total number of pre- and post-injury races; binary variables of completion of 1, 3 and 5 races; pre- and post-injury total distance raced in furlongs; pre- and post- injury maximum RPR (handicap rating); number of days to first race after injury; minimum, median and maximum intervals between all races post-injury.</p>
<p>Were the correct measurements chosen?</p> <p>Do they that reflect (or are they strongly related to) the outcome of interest?</p>	<p>Yes</p> <p>Yes</p>
<p>Were previously established validated methods used to make the measurements?</p> <p>(e.g. Glasgow pain score, International Units etc)</p>	<p>The lesion severity scoring method used was recommended in a consensus statement.</p>
<p>Are the statistical methods described?</p>	<p>Yes although further detail is required to fully understand the analysis.</p>
<p>Was the statistical significance level stated?</p>	<p>Yes: $P < 0.05$</p>
<p>Was the sample size justified?</p>	<p>A sample size calculation is not described in the methods. In the discussion section, a post-hoc power calculation is presented which suggests the study was significantly under-powered.</p>
<p>Was ethical approval obtained?</p>	<p>Not stated</p>
<p>Overall, are the methods described in enough detail that you could repeat them?</p>	<p>No, further clarity is required about the case matching process and the statistical methods used.</p>

Results	
Were the basic data adequately described?	Table 2 provides some basic data, although the way the control horses are presented (pre and post injury) is somewhat confusing.
Do the numbers add up? Are all subjects accounted for?	The numbers of animals for “horse origin”, when added up in the text, do not equal the total number of animals in the study. Additionally, the denominator for the control horses in the “return to racing group” in Table 2 is different to the total started with, without explanation as to where the missing 18 animals are.
Was the statistical significance (p value) stated in the results? Is this consistent with the methods? (It should be stated in the sample size or power calculation)	Yes Yes
What were the main findings/key results?	Key results relevant to this BET: Treatment group was significantly associated with lesion severity with mildly affected horses more likely to receive controlled exercise compared to other types of treatments. 24 horses received controlled exercise and 38 were bar fired (with a recommendation to receive controlled exercise). No significant differences were found between any of the outcomes measured where treatment groups were compared.
Discussion and conclusion	
What do the main findings/key results mean?	The authors report that the lack of association between treatment and outcomes related to post-injury race performance suggest that there is no advantage in bar firing over controlled exercise for return to racing after superficial digital flexor tendon injury. They do discuss that the small power may have had an effect on the result.
Are the negative findings discussed?	Yes

