Critically Appraised Topic

Does extracorporeal shockwave therapy or radial pressure wave therapy improve return to function over conservative and/or surgical management in horses with proximal suspensory desmitis?

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Background

Proximal suspensory desmitis (PSD) is a commonly diagnosed condition affecting a range of equine populations, but most commonly seen in mature sports horses (Dyson 1994). Previous studies have shown that the percentage of those horses affected returning to their previous level of work varies greatly with conservative management (40%) or surgical treatment (70–87%) (Norvall et al. 2015). Which limb is affected also plays a significant role with up to 90% of forelimb injuries returning to work compared to only 40% of hindlimb injuries (Dyson 1994). Extracorporeal shockwave therapy ECSWT and radial pressure wave therapy (RPWT) have been advocated for the management of many tendon and ligament disorders, such as superficial flexor tendinitis (Kersh et al. 2018) and PSD (Caminoto et al. 2005) based on results in experimental research models. The exact mechanism by which ECSWT or RPWT exerts their effect within tendon and ligaments is not known. One theory is that it relates to induction of analgesia from the effect on sensory nerves (Bolt et al. 2004). Experimental studies have, however, also demonstrated deleterious effects on tendon explant cultures (Bosch et al. 2007). The relevance of this in the clinical situation is not known. ECSWT and RPWT are both included in this critically appraised topic (CAT) to enable a larger body of literature to be used. Multiple theories regarding the mechanisms and relative efficacy of the two methods are offered in the literature, with many suggesting ECSWT to be superior. However, large meta-analyses within human rehabilitation literature have concluded the modalities are equally as efficacious for the management of tendon and ligament disorders, and that the majority of available ECSWT devices generate waveforms rather than true shockwaves (Schmitz 2015). This study aims to evaluate the literature relevant to functional outcomes following the use of ECSWT or RPWT in PSD in horses.

PICO question

Does RPWT or ECSWT improve the return to function in horses with proximal suspensory desmitis?

- **Population**: Horses with proximal suspensory desmitis
- **Intervention**: Extracorporeal shockwave therapy or radial pressure wave therapy
- **Control**: Horses with PSD managed conservatively
- **Outcome**: Return to previous athletic activity

Search strategy

CAB Abstracts were used to search for relevant literature. The following terms were used, and four relevant papers were identified.
PSD and two cases had both forelimb and hindlimb PSD. Cases were additionally assessed for lameness grade and ultrasonographic appearance of lesions at the beginning and end of treatment. All horses were subject to the same treatment protocol: radial pressure wave therapy (2000 impulses at 10 Hz) given at 2-week intervals for 3 treatments followed by an ascending exercise programme. Horses then had a further lameness examination at 6 months. Fifty horses were reassessed by the author, 8 horses by the referring vet and the final 2 horses’ results were obtained via telephone consultation with the owner. Of the 19 forelimb cases re-examined by the authors, 10 (53%) were in full work at 6 months, and for the 43 hindlimb cases, 18 (41%) were in full work. These results were then compared with the results of a previous series of cases of acute hindlimb PSD seen at one of the clinics where they found 18-21% in full work at 6 months and a previous series of cases of chronic PSD where 0/11 cases were in full work at 6 months (Dyson 1994). The authors concluded that for chronic PSD in the forelimb and hindlimb, RPWT resulted in more horses being in work at 6 months compared to that of a controlled exercise program alone. The control populations were not contemporaneous and the outcomes for forelimb PSD cases were compared with those in a previous series of hindlimb cases. Forelimb PSD cases are reported to respond better to conservative management than hindlimb PSD so it becomes difficult to draw firm conclusions from these results.

Lischer et al. (2006) reported a retrospective series of 52 cases seen between 1999 and 2003. Their inclusion criteria were as follows: (i) improvement by one AAEP lameness grade in response to palmar metacarpal or deep branch of the lateral plantar nerve anaesthesia; (ii) negative or mild improvement to intraarticular anaesthesia of the tarsometatarsal joint. This mild improvement was not defined by the authors. Within the group of the 52 horses, 34 forelimbs had PSD (1 bilateral) and 22 hindlimbs had PSD (3 bilateral). Cases were assessed for lameness grade, ultrasonographic appearance of the lesions and radiographic assessment of any sclerosis at the origin of the suspensory ligament (graded from mild to moderate). Radiographs were taken to exclude other pathologies, but it is not stated by the authors whether cases were excluded if they had concomitant orthopaedic problems. Ultrasonographic evidence of proximal suspensory desmitis was not a prerequisite for inclusion in this study. The affected limbs were then subject to the same ECSWT protocol of 2000 impulses at 240 Hz over three treatments spaced 2 weeks apart followed by an ascending exercise programme. The lameness was then reassessed at weeks 3, 6, 12, 26 and 52 post-treatment. Of the forelimb PSD cases, mean lameness grade at 26 weeks was improved from 1.8/5.0 to 0.5/5.0 with 61.0% in full work. For hindlimb PSD cases, mean lameness grade was improved from 1.95/5.0 to 1.29/5.0 with 40.8% in full work at 26 weeks. These results were compared to that of a controlled exercise program alone, which resulted in 13% in full work at 6 months previously reported with rest and rehabilitation alone (Dyson 1994). A degree of interobserver error may be present with assessment performed by more than one individual. This paper has no contemporaneous control group(s) and relies on comparisons with the previous literature. There is lack of binding of assessors leading to treatment bias and lack of contemporaneous control groups. 

A more recent paper by Norvall et al. (2015) compared the outcome and time to return to work for horses with hindlimb PSD that were treated either surgically with neurectomy and fasciotomy or with ECSWT. This study is the only one of those described to compare ECSWT to surgical management rather than to conservative management. The inclusion criteria were as follows: (i) improvement of lameness to deep branch of the lateral plantar nerve analgesia; (ii) ultrasonographic findings consistent with PSD. Seventy-five horses with hindlimb proximal suspensory desmitis were included in the study. Initially, 41 horses were treated surgically, and 34 cases with ECSWT. Of the 41 surgically treated cases, 24 horses (58%) returned to their previous level of work with a mean time to return to work of 10.1 months. Twenty of the 34 cases (59%) treated with ECSWT returned to their previous level of work with a mean time to return to work of 7.4 months. The authors claimed their results indicated that within this study ECSWT resulted in a faster return to work with success rates similar to that of surgical treatment of PSD. Fifteen horses remained lame following their initial treatment and were then treated with the other modality. Seven of these horses returned to their previous level of work following both treatments. Previously reported results of surgical treatment with neurectomy and fasciotomy reported 44% of horses with concurrent lameness issues to be in work at one year, compared to 77% of horses where PSD was the sole complaint (Dyson and Murray, 2012). Within this paper, it is not discussed if there were any concurrent lameness problems, however, both treatment groups results fall within these ranges. The limitations of the study by Norvall et al. (2015) include lack of randomisation of treatment groups; however, it is less subject to interobserver error and provides a more straightforward account of the prognosis to inform owners.

Conclusion

The question this paper asked (Does RPT or ECSWT improve the return to function in horses with proximal suspensory desmitis?) is not able to be unequivocally answered based on the literature reviewed. Studies published to date on ECSWT and PSD mostly comprise retrospective case series, with only one prospective case-control study. The follow-up within all the studies is of limited duration (between 6 months and one year), providing little information on the long-term prognosis for horses with PSD. Outcome measures are not standardised not assessors blinded as to treatment.

Inclusion criteria were often limited to clinical investigation without diagnostic imaging which may influence the population studied and means improvement in appearance on imaging could not be incorporated into outcome measures. There are two studies supporting an improved outcome with either ECSWT or RPT over rest and rehabilitation alone, but both studies had significant weaknesses that make drawing any firm conclusion impossible. None of the case series included indicated a worse functional outcome for horses treated with ECSWT or RPT compared to other regimes. Further prospective randomised case-control studies would be required to fully elucidate the impact of ECSWT and RPWT. It would be helpful to standardise both the inclusion criteria and outcome measures for future studies.
Authors’ declaration of interest
No conflicts of interest have been declared.

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Not applicable.

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