

How to use Extracorporeal Shock Wave Therapy in the nuchal ligament area

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Take Home Message:

Extracorporeal Shockwave Therapy is an very effective method of treatment problems in the area of the nuchal ligament. 22 treatments were monitored and did show an improvement in over 85% of the cases.

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Introduction:

The nuchal ligament area is a frequent place of serious problems in riding horses. Head shaking, reluctance to bend the neck and serious resistance to the reins are clinical signs of problems, they may have their origin in the nuchal ligament area.

Insertion-desmopathy of the nuchal ligament (ID), non-infectious bursitis of the nuchal bursa (B) and calcifications of the nuchal ligament (C) are changes with may be of clinical significance in horses.

Insertion-desmopathies are a very common finding in horses. You mostly find them at the insertion of the suspensory ligament, but not rarely you have the problem at the nuchal ligament. All illnesses induced by an acute or chronic trauma of tendons or ligaments in their insertion areas following degeneration and reparation are titled as insertion desmopathies. Exostosis or calcification are mostly seen as the final answer of the healing process over scar formation.

New bone formation may occur in the region of the nuchal ligament. The extension of this enthesiophyte formation often surpasses the site of insertion slightly dorsal and ventral. Mineralization in the soft tissue occurs often as a result of a previous trauma, for example in the nuchal ligament, caudal to the occiput.

Knowing that those radiographical findings are often incidental, horses with affected clinical problems like reluctance to bend the head or neck or head shaking syndrome have been treated with local infiltrations combined with different types of training up to now. This programme has very wide spread results.

The use of ESWT may provide an additional method to treat the nuchal ligament area. This non-invasive method has been used in suspensory lesions with great success. Because of the similar structures and pathology between suspensory and nuchal ligament treatment with ESWT was carried out.

Materials and Methods:

All the horses passed first a clinical examination. If the problem was suspected, it would be located around the nuchal ligament, X-rays of the poll and surrounding tissue were made. The horses underwent an ultrasound examination, if the diagnosis could not be done on the X-rays alone. Local anaesthesia with mepivacaine¹ had been done in 60 % of the horses to determine the problem area. In the other 40 % of the horses a scintigraphy² was carried out to underline the clinical findings.

So we confirmed a group of 22 horses to be treated with ESWT. The 22 warmblood horses in this study were between 5 and 10 years old , 12 geldings and 10 mares.

Every horse was treated three times with a focused shock wave generator. The time period between two ESWT ranged from 4 to 8 days. The preparation for ESWT includes shaving of the selected area and sedation of the horse with detomidine HCL (10-20 mg/kg IV)³ and butorphanol tartrate (0.01 – 0.02 mg/kg IV)⁴. Afterwards they received 1200 shots at the level 6(0.5 nJ/mm²) with the Storz Minilith Shockwave generator⁵.

See picture 1: Shockwave Therapy in the Nuchal Ligament area

Every horse was examined three times after the last ESWT treatment (4th, 10th and 20th week). Those examinations were done clinically and with Ultrasound or X-Rays.

Results:

To define the results of our findings, we divided the horses in four groups:

Group	Type	Number of horses
1	Insertion Desmitis (ID)	7
2	Calcification (C)	5
3	Bursitis (B)	4
4	Ins.Desm. and Calcification	6

The findings of the clinical re-examination were divided into three classes: 1 = no change (-); 2 = improved(+/-); 3 = good (+):

Group	Type	4 th week			10 th week			20 th week		
		1	2	3	1	2	3	1	2	3
1	ID	4	2	1		6	1			7
2	C	3	2		2	1	2		2	3
3	B	4			2	2		2		2
4	ID+C	3	2	1	2	3	1	1	2	3
Total		14	6	2	6	12	4	3	4	15

The horses did count as successfully treated (+), if they did not show any more of the signs, they were treated for. A horse did count as improved (+/-), if the clinical signs were diminished. Horses with no improvement or even a worsening, belong to the class 1 (-).

Discussion:

First it has to be mentioned, that it is a matter of clinical observations. Due to the small amount of patients showing the different signs, we did not make any statistics. Our goal is to give a tendency, which cases might be treated with ESWT in future time.

According to Schnewlin and Lischer (2001) the field of using ESWT in horses is still open. It is well known, that horses with lesions of the suspensory ligament can be treated very successfully by ESWT (Walliser and Witzmann, 2000; Brems, 2001). Due to similar findings in the nuchal area, we treated this area with ESWT.

At the first reexamination (4th week) just 2 of the horses were totally improved. 6 horses showed a slight improvement, whereas the others seemed to be unchanged. According to these results, we assume that it takes at least 6 weeks to obtain a healing process.

6 weeks later, 16 of the horses showed improvement and four seemed to have progressed. This upward tendency of healing became more obvious at the last reexamination, where more than two thirds of the horses were clinically healed and additionally 4 horses did improve (total 86,4 %). Only three horses (13.6%) did absolutely not improve.

We think, that it will be just a question of time until the main part of the horses with an improvement at the 20th week is going to be normal to ride. The reexamination were carried out mainly clinically because of the bad correlation between radiological findings and the clinical signs. Knowing that many horses with radiographic changes of the nuchal ligament, do not show any clinical symptoms, the improvement in riding seems to be a better parameter to measure the success of ESWT. But all the horses with sonographic changes did show the clinical improvement sonographically as well.

Assuming that almost all horses with ID, C and ID + C can be successfully treated with ESWT, we think that a direct involvement of the nuchal ligament has a better prognosis than horses with a bursitis of the nuchal bursa.

It remains to be a subject of further investigations or observations to determine the effect of ESWT in combination with physiotherapy of activating injections. But we assume that a combination of different therapeutic ways may even improve and accelerate the healing process.

Footnotes:

- ¹ Mepivacain® 2%, Intervet Deutschland GmbH; Unterschleissheim, Germany.
- ² ScinTequi, Forschungszentrum Jülich GmbH and Dr. Bernd Schlarmann, Munich, Germany.
- ³ Domosedan®, Orion Corporation, Espoo, Finland.
- ⁴ Torbugesic®, Fort Dodge Animal Health, Fort Dodge, IA 50501.
- ⁵ MINILITH® SL1, Storz Medical AG, Kreuzlingen, Switzerland.

References:

Brems R, Cartanjen B, Kaminski M. Extracorporeal shock wave therapy, in *Proceedings*. WEVA, World 6th Congress 1999; 229.

Brems R. Stosswellentherapie: Grundlagen, Technik, Anwendung und Vergleiche mit anderen therapeutischen Techniken, in *Proceedings*. 7th Congress on Equine Medicine and Surgery Geneva 11th to 13th December 2001; 112-114.

Muschter R, Böhlen D, Thüroff S, et al. High intensity focused ultrasound in urology – consensus report. In: Chaussy C, Eisenberger F, Jocham D, Wilbert D, eds. *High Energy Shock Waves in Medicine*. Stuttgart: Thieme, 1997; 140-146.

Nowak M. Die Insertionsdesmopathie des Nackenbandes beim Pferd, in *Proceedings*. 7th Congress on Equine Medicine and Surgery Geneva 11th to 13th December 2001; 26-28.

Schleberger R, Delius M, Dahmen GP, et al. Orthopedic extracorporeal shock wave therapy – method analysis and suggestion of a prospective study design – consensus report. In: Chaussy C, Eisenberger F, Jocham D, Wilbert D, eds. *High Energy Shock Waves in Medicine*. Stuttgart: Thieme, 1997; 108-111.

Walliser U, Witzmann P. Extrakorporale Stosswellentherapie, in *Proceedings*. Fortbildung der Landestierärztekammer: Spezielle Lahmheitsdiagnostik, Bad Boll 2000.

Brems R, Weiss D. Extracorporeal shock wave therapy at the insertion desmopathy of the nuchal ligament in horses, in *Proceedings*. 1st Symposium of Extracorporeal Shock Wave Users in Veterinary Medicine, Sottrum 2002; 11-12.

McClure S. Principles of physics and technology in ESWT, in *Proceedings*. 1st Symposium of Extracorporeal Shock Wave Users in Veterinary Medicine, Sottrum 2002; 15-17.

Schwarck R. Shock waves and pressure waves for ESWT, what is the difference? in *Proceedings*. 1st Symposium of Extracorporeal Shock Wave Users in Veterinary Medicine, Sottrum 2002; 28.

Weiler H. Anatomical and pathological fundaments for extracorporeal shock wave therapy (ESWT), in *Proceedings*. 1st Symposium of Extracorporeal Shock Wave Users in Veterinary Medicine, Sottrum 2002; 35-37.

Butler JA, Colles CM, Dyson SJ, et al. The head. In: Butler JA, Colles CM, Dyson SJ, et al, eds. *Clinical radiology of the horse*. Oxford: Blackwell Science Ltd., 2000; 327-402.

Schnewlin M, Lischer C. Extrakorporale Stosswellentherapie in der Veterinärmedizin. *Schweiz Arch Tierheilk* 2001;143:227-232.



Picture 1: Shockwave-Therapy in the nuchal ligament area