

## **Study of shock wave therapy in horses with the "Masterpuls MP100" system offered by Storz Medical AG**

by Mark Kaminski

### **I) Abstract:**

In the past, shock and pressure wave therapy has gained a strong foothold in equine orthopaedics. In this field, mainly chronic tendon and connective tissue diseases as well as metaplasia and small bone fissures are treated. A study carried out with a total of 18 horses exhibiting different syndromes shows the treatment course and the results obtained. A positive effect of shock wave therapy on the treatment results was observed.

### **II) Introduction:**

Since the middle of the nineties, the use of shock and pressure wave therapy for the modern treatment of equine orthopaedic disorders has gained increasing importance. This acoustic wave revealed by chance in aeronautical engineering was originally applied in human medicine for the disintegration of kidney stones, the treatment of shoulder calcifications and heel spurs as well as of other types of insertion desmopathy. In physical terms, one has to distinguish between extracorporeal shock waves and unfocused ballistic pressure waves.

Extracorporeal shock waves are acoustic waves with extremely high intensity and very short duration. In this case, a coupling cushion is employed to couple the shock waves to the patient's body with a focusing device designed to allow the waves to be focused on the desired target zone under continuous ultrasound control.

In order to generate these high-energy waves, shock wave therapy employs three different types of generator systems: spark gap systems, which work like automotive spark plugs, piezoelectric systems and electromagnetic shock wave emitters which are characterized by the fact that the generated energy is converted into sound waves by means of electro-acoustic converters. With the ballistically generated unfocused pressure wave, the kinetic energy is transmitted to the skin in the treatment area by an elastic shock imparted by means of a stamp. The pressure waves thus generated propagate radially inside the tissue without requiring any focusing device with optical control.

Owing to this radial pressure propagation in the tissue and the easy handling of the shock transmitter, the ballistic shock wave therapy has gained ground in equine orthopaedics as compared to ESWT (extracorporeal shock wave therapy). As the defect inside the tissue is treated over a large area, ultrasonic shock wave focusing is not necessary.

The disorders of the locomotor apparatus treated most frequently by means of shock wave therapy are insertion desmopathy, sesamoidosis, chronic tendonitis, metaplasia, myopathy and partly small fissures.

The shock wave produces a locally restricted vasodilatation of the vessels within the tissue with simultaneous tissue hyperemia. In addition to this, effects on the peripheral nervous system, stimulation of cell division, alignment of the fibrous tissue, dissolution of fibrosis and improvement in the tissue elasticity are being discussed.

### **III) Materials and method:**

Eighteen horses of different sex with the age of four to sixteen years were treated with the shock wave system Masterpuls MP100 of Storz Medical AG in the fourth quarter of 2003 and the first quarter of 2004. This patient group is subdivided into nine horses with disorders of the pastern tendon origins (six of which at one fore leg,

three at one hind leg), four horses with disorders of the flexor tendon apparatus, one horse with sesamoidosis, two horses with metaplasia of the superficial flexor tendon, one horse with calcification of the m. semimembranosus and one horse exhibiting myopathy of the m. longissimus dorsi.

All horses were subjected to an extensive lameness examination accompanied by a corresponding picture recording process (sonography, digital luminescent radiography).

Each therapy session comprised 2000 shock wave units with a pressure intensity adapted to the specific treatment area. The treatment sessions were repeated at intervals of 14 days.

With sensitive horses, sedation with approx. 0.5 ml Domosedan administered intravenously is recommended.

### **Masterpuls MP100 therapy of Storz Medical AG:**

Number of horses treated: 18

Number of horses sedated with Domosedan: 5 (0.5 ml, intravenous injection)

<b>Syndrome</b>	<b>PTO</b>	<b>SFT/DFT/SL</b>	<b>Sesamoid bones</b>	<b>Metapl. SFT</b>	<b>M. semimembr.</b>	<b>Back</b>
Number of patients	9	4	1	2	1	1
Number of pre-treated horses	4	1	1	-	1	1
Lameness for more than 4 weeks	7	3	1	2	1	1
Single treatment	1	-	-	-	-	-
One treatment repetition	4	2	-	-	-	1
Two treatment repetitions	4	1	1	1	1	-
More than two treatment repetitions	-	1	-	1		-
<b>Supplementary therapies</b>			-			
Heparin, vitamin B12	3	1	-	-	-	-
Thermotherapy	6	4	1	2	-	1
Controlled walk exercises	9	4	1	2	1	-
Egg shoe	8	4	1	1	-	-
Feed supplement (inorganic sulphur)	7	3	-	-	-	1

PTO: pastern tendon origin / SFT: superficial flexor tendon / DFT: deep flexor tendon / SL: suspensory ligament of the deep flexor tendon

Four of the nine horses exhibiting disorders of the pastern tendon origins had been pre-treated; seven horses had suffered from the injury for more than four weeks. One horse required a single shock wave therapy, with four horses the treatment session had to be repeated once and four animals had to be treated three times.

In addition to this, three horses were treated locally with subcutaneous injections with a mixture of heparin (25000 I.U.) and a vitamin B12 preparation (2 ml).

Six horses were subjected to supplementary thermotherapy in the form of ointment application. All horses performed controlled walk exercises on hard ground. While eight of these horses were provided with egg shoes, inorganic sulphur was administered as feed supplement to seven animals.

One horse of the four horses suffering from flexor tendon disorders had been pre-treated; three of the horses had already suffered from the disease for more than four weeks. With two horses the treatment had to be repeated once, one horse required two repetitions of the treatment. One of the horses had to undergo more than three treatment sessions.

While heparin and vitamin B12 was administered to one horse as supplementary measure, all horses were subjected to thermotherapy and controlled walk exercises and provided with egg shoes. Three of the horses were additionally fed with inorganic sulphur.

The horse exhibiting sesamoidosis had suffered for more than four weeks from this disease and required two treatment repetitions. This horse was additionally subjected to thermotherapy and controlled walk exercises and provided with egg shoes.

Both animals suffering from metaplasia of the superficial flexor tendon had not been pre-treated and the syndrome had appeared more than four weeks before the Masterplus MP100 treatment. One of these horses required two treatment repetitions, for the other horse more than three treatment sessions were necessary. In addition to this, both patients underwent thermotherapy and performed controlled walk exercises. One horse was provided with egg shoes.

At the time of the therapy, the horse suffering from m. semimembranosus calcification had been pre-treated and suffered for more than four weeks from this disorder. The treatment was repeated two times with controlled walk exercises being carried out as supplementary measure.

The horse subjected to the therapy that had suffered for more than four weeks from myopathy of the m. longissimus dorsi had been pre-treated and required two treatment sessions combined with supplementary thermotherapy and inorganic sulphur being additionally administered.

#### IV) Result:

##### Re-examination carried out 14 days after the last treatment

	PTO	SFT/DFT/SL	Sesamoid bones	Metapl. SFT	M. semimembr.	Back
Aggravation	-	-	-	-	-	-
Cont. lameness	-	-	-	1	-	-
Minor improvement	2	1	-	-	-	-
Clear improvement	3	2	1	1	1	1
No sign of lameness	4	1	-	-	-	-
Relapse	-	-	-	-	-	-

The re-examination of the patients with disorders of the pastern tendon origins showed a slight improvement for two horses, a clear improvement for three horses, while four horses were absolutely free from signs of lameness.

It can generally be observed, that the chances of recovery are better with disorders of the pastern tendon origins at the front limbs than with those at the hind limbs.

During the re-examination of SFT / DFT and SL disorders, a minor improvement was obtained in one case, a distinct improvement in two cases and one horse exhibited no lameness at all.

While the re-examination of the horse suffering from sesamoidosis revealed a distinct improvement of the clinical picture, the treatment of the m. semimembranosus also resulted in a clearly improved footing of the leg concerned.

With the horse treated for myopathy of the m. longissimus dorsi, the re-examination showed a considerable improvement of the clinical picture as well.

Up to now, none of the examined horses showed signs of recurrent lameness.

#### **V) Discussion:**

Shock wave therapy should not be considered as competitive treatment to classical and conventional forms of therapy. With acute inflammatory processes, antiphlogistic therapies are recommended in order to achieve an interruption of the inflammation cascade in the tissue. However, with long-term and/or chronic disorders, the non-invasive and generally accepted shock wave therapy represents an excellent alternative to the application of caustic ointments, "Müller-Wohlfahrt injections", and hyaluron acid injections or to outdated treatment methods like "firing".

The presented therapy results obtained within the frame of this study emphasize and complement existing experience gathered by other clinics and underline the prior importance and high efficiency of this type of therapy in equine orthopaedics.

Additional research work and examination results in terms of cytological modifications after shock wave therapy are being prepared at the University of Zurich.

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