

medicalsports network

05.11

Prevention, therapy and a sporting life for amateurs and professionals

Usain Bolt,

the „fastest man alive“ and the rest of the Jamaican relay team set a new world record on their way to winning the gold at the World Championships at Daegu.

→ **SPECIAL EDITION**

SHOCK WAVE THERAPY IN HIGH-PERFORMANCE SPORT

PROF. DR. CHRISTOPH SCHMITZ / DR. MARK HENNE

EMS⁺
ELECTRO MEDICAL SYSTEMS



Shock wave therapy

Myth or evidence?

Dr. med. Mark Henne, Orthopaedic Surgery Practice, Fürstenfeldbruck

Prof. Dr. med. Christoph Schmitz, Department of Anatomy, Ludwig Maximilian University of Munich

For a long time, any discussion concerning alternative treatment of top-level athletes was held behind closed doors.

The scientific literature contained scant reference. But when Aksel Lund Svindal spoke out publicly about his rapid recovery and return to training after receiving shock wave treatment in autumn 2009, all that changed. It didn't hurt that he then went on to win a Gold medal at the Vancouver Olympic Games in 2010.

Recently, Dr. Paco Biosca (former Director of the Department of Medicine and Sport Adaptation of Shakhtar Donetsk FC in Ukraine; currently Medical Director of Chelsea FC, London) spoke of reports in the public domain on the successful use of shock wave therapy in professional football and we feel the time is right to assess the playing field. On the strength of at least ten prospective, randomized, controlled studies published in international peer-reviewed specialist

literature the authors can conclude that (1), modern shock wave therapy has an established place in the treatment of plantar fasciitis, Achilles tendinopathy, tennis elbow, calcifying tendinitis of the shoulder, trochanter major pain syndrome, pseudarthroses and other indications affecting the musculoskeletal system and (2), owing to the medical payment system operating in a given country, the preferred use of shock wave therapy varied depending on whether the injury is chronic

or acute. In Germany, for example, it is often used in chronic cases where conventional treatment has proved unsuccessful whereas in Malaysia shock wave is successfully employed in a growing number of acute cases (3). This is provoked by health-related economic aspects. In Malaysia the patient is personally responsible for payment and receives no sick pay which will tend to inspire a reduction in both the period of convalescence and the risk inherent in the treat-

ment. Shock wave treatment delivers on all counts and it is exactly these properties and assets which have created a peaking of interest in top-level sporting circles.

Aksel Lund Svindal and Kristin Størmer Steira

When Aksel Lund Svindal suffered severe muscle injury in a fall in Saas Fee in October 2010 his doctors and physiotherapists decided in favor of treatment with focused shock waves (after consulting [C.S.]) (4). The treatment was so successful that he resumed training much earlier than expected and a few months later went on to great success at the Vancouver Winter Olympics in 2010 (5). In the wake of numerous enthusiastic reports of his treatment and speedy recovery which were broadcast on Norwegian TV (6), other top-level Norwegian athletes sought out the expertise in his [C.S.] capacity as medical scientist on the validity of shock wave treatment. When it became public that Olympic gold-medal cross-country skier Kristin Størmer Steira was also a shock wave success story the light was out of the box (7).

FC Shakhtar Donetsk

Dr. Paco Biosca (8) reported to the 2nd World Congress of the International Association for Radial Pain Therapy (9) in October 2010 in Berlin on his experience with radial shock wave therapy in professional football (10). Among the posts held by Dr. Biosca before his time with Shakhtar Donetsk was that of President of the European Federation of Orthopaedic Sports Traumatology (EFO-ST) and of the Spanish Association of Football Club Doctors (AEMEF). According to Dr. Biosca, it is a simple matter to decide whether or not a particular treatment is indicated for professional footballers: “The treatment was good if the player returns to his maximum performance level without missing competitions (or missing only a small number of them; and the treatment was bad if the player cannot play or needs more time to recover than established on average” (10). Dr. Biosca reported good experience with radial shock wave treatment of disorders of the lumbar spinal cord, plantar fasciitis and

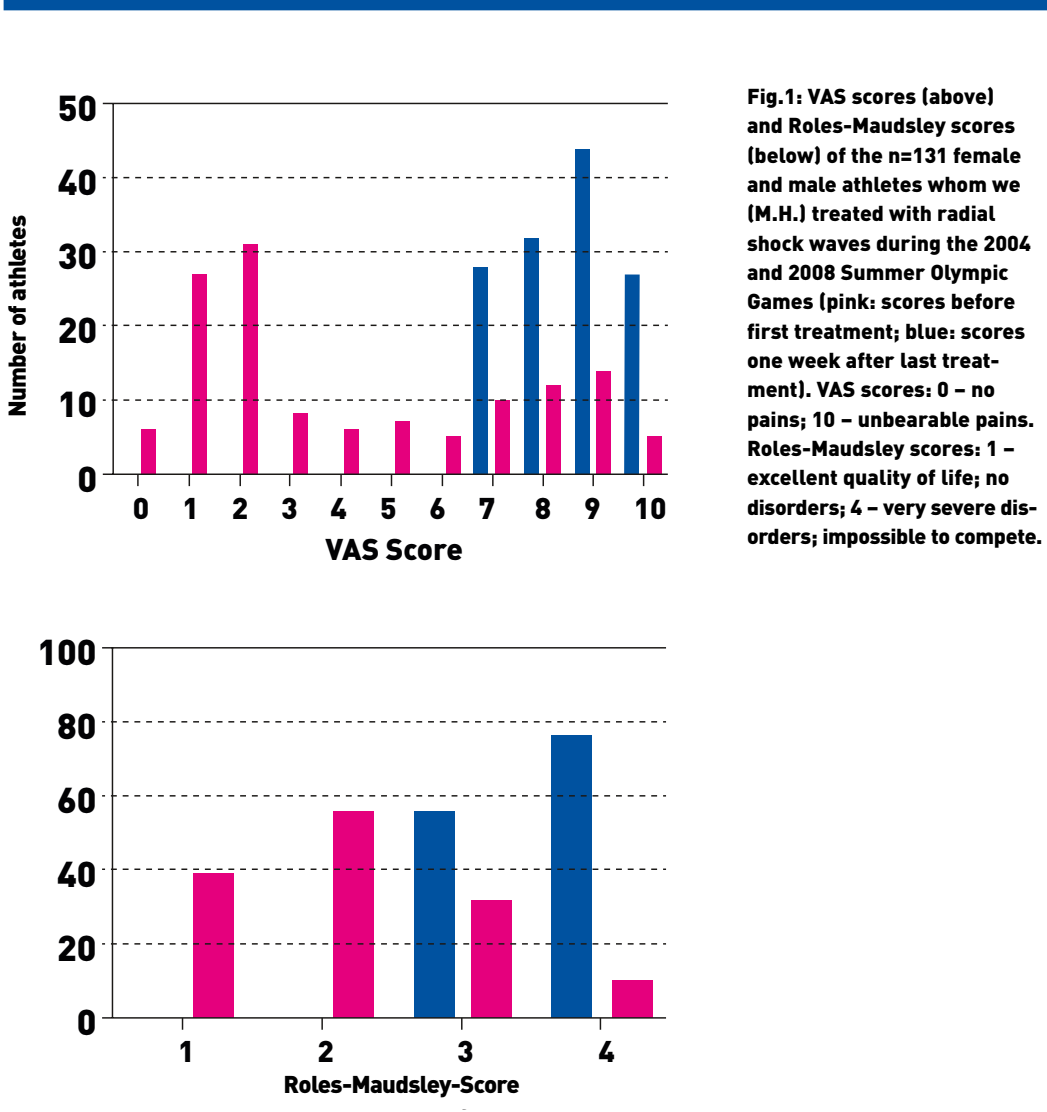


Fig.1: VAS scores (above) and Roles-Maudsley scores (below) of the n=131 female and male athletes whom we (M.H.) treated with radial shock waves during the 2004 and 2008 Summer Olympic Games (pink: scores before first treatment; blue: scores one week after last treatment). VAS scores: 0 – no pains; 10 – unbearable pains. Roles-Maudsley scores: 1 – excellent quality of life; no disorders; 4 – very severe disorders; impossible to compete.

Tab.1: Sporting disciplines and injuries of the n=131 female and male athletes whom we (M.H.) treated with radial shock waves during the 2004 and 2008 Summer Olympic Games.

Sporting discipline	n	Injury	n
Light athletics	86	Muscular (acute)	34
Taekwando	8	Achillodynia	27
Handball	6	Muscular (chronic)	22
Judo	5	Plantar fasciitis	16
Weightlifting	4	Patellar apex syndrome	12
Tennis	4	Tendinitis of the shoulder	8
Beach volleyball	3	Radial / Ulnar epicondylitis	7
Boxing	3	Quadriceps tendinitis	3
Wrestling	3	Bursitis trochanterica	2
Badminton	2		
Fencing	2		
Triathlon	2		
Shooting	2		
Modern pentathlon	1		



Christoph Schmitz

- // Since October 2010 Head of the Department of Neuroanatomy at the LMU Munich
- // 2008 to July 2011 International Business Manager Orthopaedics and Medical Scientific Officer of EMS Electro Medical Systems S.A. (Nyon, Switzerland, since October 2010 part time)
- // Main research interest (amongst others): Molecular and cellular mechanisms of action of extracorporeal shock waves in the musculoskeletal system



Mark Henne

- // Specialized in Orthopaedics and Trauma Surgery
- // Since 2009 member of an orthopaedic group practice with Dr. Willibald Wittmann in Fürstentfeldbruck near Munich

Network

- // Medical support physician for the IOC in the Olympic Village in Athens (2004) and in Beijing (2008)
- // Member of medical support team specialized in shock wave therapy with the 2006 FIFA World Cup

various tendinopathies, predominantly proximal insertional tendinopathies of the adductor muscles (according to the UEFA Injury Study a very common indication in professional footballers (11). Dr. Biosca's experiences square well with the findings of Caccio *et al.* (2011) (12), who recently demonstrated the superiority over conventional treatment of radial shock wave therapy in proximal insertional tendinopathies of the ischiocrural musculature in a prospective randomised controlled study on a total of 40 professional athletes (including nine professional footballers).

2004 and 2008 Summer Olympic Games

In the 2004 Summer Olympics in Athens and 2008 Summer Olympics in Beijing, we (M.H.) used radial shock waves to treat a total of $n=131$ athletes from different sporting disciplines with a wide range of disorders in the official outpatients clinics of the particular Olympic villages (Table 1: on average 2.12 treatments per athlete). One week after the last treatment, we reviewed the treatment outcome in comparison with the situation before the first treatment using the visual analogue scale (VAS) and a modified Roles-Maudsley score. The mean VAS scores improved from 8.53 ± 0.09 (mean value \pm standard error of the mean value) before the first treatment to 4.15 ± 0.28 one week after the last treatment, and the mean Roles-Maudsley scores improved from 3.57 ± 0.04 to 2.07 ± 0.08 (III. 1). These changes were statistically significant (in each case, bilateral chi-square test; $p < 0.001$).

Shock wave therapy alone or in combination?

We absolutely recommend combining shock wave therapy with other forms of sports medicine treatment. We base this view on the individual experience of the therapist and the individual disorder profile of the athlete (physiotherapy including osteopathic and chiropractic interventions, cryotherapy and thermotherapy, ultrasound and electrotherapy, local inflammation-inhibiting infiltrations with the homeopathic remedy Traumeel®, Kinesio tape, acupuncture, etc.). To

give details would be to go beyond the scope of this article. Further information can be obtained from the authors.

Summary

Modern shock wave therapy for the musculoskeletal system has successfully found its place in the treatment of top-level athletes. This is based essentially on (i) rapid treatment successes with minimum treatment risk, (ii) given proper and appropriate application, almost complete absence of adverse events, (iii) the non-invasive nature of the method, and (iv) compatibility with anti-doping regulations. Thanks to the development of small, mobile shock wave units, the treatment can now be administered in competitions and during away-games. Given our modern understanding of the molecular and cellular mechanisms of action, intensive pre-clinical and clinical research has started combining shock wave therapy with other therapy forms (e.g. injection with platelet rich plasma, PRP), in order to give an even greater boost to the performance capability of modern shock wave therapy, particularly in top-level sport.

// mark_henne@arcor.de

// christoph.schmitz@med.uni-muenchen.de

Literature

- [1] In the American Journal of Sports Medicine, American Journal of Bone and Joint Surgery, Foot & Ankle International, etc. – and elsewhere.
- [2] E.g., see Schmitz and DePace, Urol Res 2009;37:231–234 and particularly the literature cited there)
- [3] E.g., see. <http://thestar.com.my/health/story.asp?file=/2011/2/6/health/7867544&sec=health>
- [4] www.aksellundsvindal.com/blog_cms/arkiv/2009/11/?intOffset=1
- [5] See also www.ems-company.com/media/Images%202/100331_Akset%20Lund%20Svindal_Flyer_EN_wc.pdf
- [6] www.nrk.no/nett-tv/arkivert/117123/
- [7] www.ems-company.com/media/PDF%20NEW/Kristin-Stormer-Steiral_Flyer.pdf
- [8] www.chelseafc.com/page/TheManagement/0,,10268-2393769,00.html
- [9] www.atrad.ch
- [10] www.atrad.ch/images/stories/pdf/abstract%20booklet_fa-386-en_2010.pdf
- [11] Compare Werner *et al.*, Br J Sports Med 2009;43:1036–1040
- [12] Am J Sports Med 2011;39:146–153

SWISS DUOCLAST®

THE PERFECT SHOCK WAVE DUO
FOR HIGH-PERFORMANCE SPORT
AND EVERYDAY USE IN PRACTICE →

SWISS DOLORCLAST®

> Original method
of radial shock wave therapy

SWISS PIEZOCLAST®

> Precise deep-acting effect with the use of
focused shock wave therapy★



★ Swiss PiezoClast® also available as a single unit



**"I FEEL
GOOD"**

EMS-SWISSQUALITY.COM



EMS-SWISSQUALITY.COM

EMS
ELECTRO MEDICAL SYSTEMS SA
Chemin de la Vuarpillière 31
CH-1260 Nyon

Tel. +41 22 99 44 700
Fax +41 22 99 44 701
welcome@ems-ch.com
www.ems-medical.com