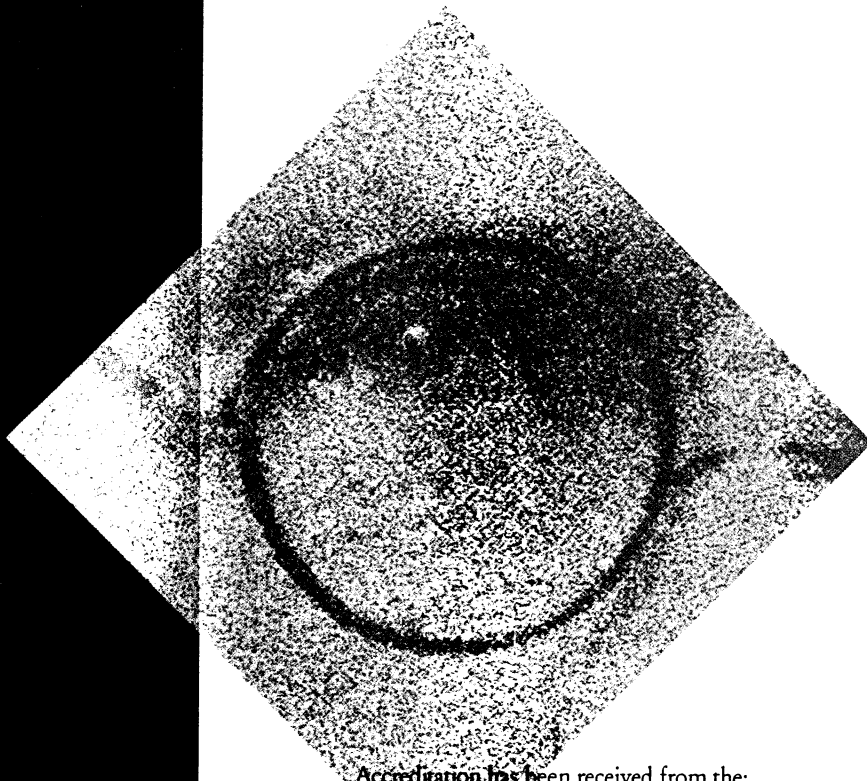


◆ Symposium

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Accreditation has been received from the:

- ◆ NCV with 3 points
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Shockwave Therapy in Lower Extremity Overuse Injuries

Dr. H. Lohrer

Introduction: Insertional and non-insertional tendinopathies are the most frequent sport induced overload injuries.

Patellar tendinopathy = Jumper's knee (JK) is the most common sport induced overuse tendon injury. It occurs especially in basketball and volleyball players. 7,4 % of our patients suffer from it. No general accepted evidence based treatment regimen is available regarding conservative as well as operative treatment (Cook & Khan 2001).

Achilles tendinopathy count for 5,8 % of the patients in our sport orthopaedic practice. By definition the term Achilles tendinopathy is reserved for degenerative Achilles tendon disease 2-7 cm proximal to its insertion. No controlled and randomized evidence is available regarding any kind of conservative or surgical therapy (McLauchlan & Handoll 2001). Treatment is based on empirical experience and is reported to be good and excellent in as much as 41 - 96 % (Tallon et al. 2001), regarding conservative and operative treatment respectively, especially in long term follow up (Paavola et al. 2000). On the other hand Achilles tendinopathy is responsible for most short, medium and long term draw backs from competitions and careers, especially in athletics. So, for example, 30 % (21/70) of the athletes in the german olympic track & field team 2000 in Sydney suffered from Achilles tendinopathy.

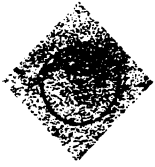
Plantar fasciitis is not so common in a sport specific population (0,5 % of all diagnoses in our practice), but it is a very frequent disorder in general population with a prevalence of as much as 1,18 % (Sadat-Ali 1998). Heel pain affects over two million Americans annually and is the most common foot problem seen in medical practice (AOFAS heel pain study group). 60-70 % of Plantar fasciitis cases show radiological evidence of a heel spur (Chigwanda 1997). However, only 10 % of all radiologically proven heel spurs are symptomatic (Rubin & Witton 1963). Systematic literature review shows only limited evidence for treatment with jontophoresis, low energy shockwave or dorsiflexion night splint (CRAWFORD et al. 2000).

In the last decade extracorporeal shockwave therapy was introduced for effective treatment of insertional tendinopathies like tennis elbow or plantar fasciitis (Lohrer et al. 2001, Rompe et al. 2002). Radial Shock Wave Therapy in principle applies a low energy shockwave to a greater volume of tissue. This fact leads to the assumption, that extracorporeal shock waves could be applied also for the treatment of Achilles tendinopathy and Patellar tendinopathy in recreational and professional athletes.

The objective of this report is therefore to present the results of several studies of our group evaluating the effectiveness of Radial Shockwave Therapy® (RSWT) in lower Extremity overuse injuries (Achilles tendinopathy, patellar tendinopathy jumper's knee, plantar fasciitis) in recreational and professional athletes.

Material and methods:

Achilles tendinopathy and Jumper's knee pilot study: 40 athletes with Achilles tendinopathy and 45 patients suffering from Jumper's knee were included in a prospective, uncontrolled pilot investigation. Achilles tendinosis was clinically diagnosed by tenderness and/or fusiform swelling of the Achilles tendon about 2-7 cm proximal to its calcaneal insertion. Jumper's knee was clinically diagnosed by tenderness at the tip of the patella. Additional inclusion criteria were load dependent Achilles tendon or pain at the patella tip for more than three months and pain resistant to at least two different conservative treatment modalities. These patients had already failed to respond to conservative therapy during 3 months preceding RSWT, with at least 2 different treatment modalities. Therefore the indication for surgery was given in principle. Treatment was done once a week in five sessions with 2,000 impulses each using the Swiss DolorClast=® RSWT device (EMS,



Konstanz, Germany). The pain center was localized using biofeedback. Follow up was done at 1, 4, 12, 26 and 52 weeks after the end of the treatment. A specially designed pressure measurement device (DolorMeter) and Visual Analogue Scales (VAS: 0 = no pain, 10 = maximal pain) were used to evaluate pain at rest and during activity. Evaluation criteria were load dependent pain, pain threshold (in Newton, using the Dolormeter), 30 N pressure pain (VAS) and the pain-free running time (min).

Plantar fasciitis study 103 patients with plantar fasciitis were included in a multicentric, prospective, placebo-controlled, randomized, single-blind study. Only patients after failed conservative therapy with at least 2 different treatment approaches during 6 months preceding RSWT, and an indication for surgery were included. 55 patients were treated with a verum RSWT while 48 patients had a sham treatment in one to three sessions with 2,000 impulses each using the Swiss DolorClast®. The pain center was localized using biofeedback. Pain at rest, pain at night, sports associated pain and pressure sensitivity were assessed by visual analogue scale (VAS) before and 1, 4, 12, 26 and 52 weeks after RSWT.

Results:

33 (82,5 %) of the Achilles tendinopathy patients finished the study. Comparing pre-treatment values to 1 and 52 week follow up investigation, all evaluation measures improved significantly (Table 1, p < 0,001).

Tab.1: Achilles tendinopathy	pre-treatment	1 wk. follow up	52 wk. follow up
Load induced pain (cm VAS)	7,8 ± 1,7	2,2 ± 2,5	0,7 ± 1,6
pain threshold (Newton)	14,1 ± 6,6	27,5 ± 10,9	41,9 ± 11,6
30 N pressure pain (cm VAS)	6,7 ± 3,2	2,6 ± 3,6	0,9 ± 2,6
Pain-free running time (min)	14,4 ± 18,5	63,0 ± 37,0	90,0 ± 43,0

88,9 % of the Jumper's knee patients finished the study. Comparing pre-treatment values to 1 and 52 week follow up investigation, all evaluation measures improved significantly (Table 2, p < 0,001).

Tab. 2: Jumper's knee	pre-treatment	1 wk. follow up	52 wk. follow up
load induced pain (cm VAS)	5,5 ± 2,3	2,8 ± 3,0	1,9 ± 2,5
Pain threshold (N)	15,1 ± 7,4	28,7 ± 14,0	35,3 ± 15,0
30 N pressure pain (cm VAS)	5,5 ± 2,9	2,3 ± 3,0	1,7 ± 2,6
pain-free running time (min)	10,4 ± 15,0	54,3 ± 50,9	70,3 ± 48,7

Plantar fasciitis study main results: Entry parameters were homogeneous in either group. The verum group showed significantly better results than the placebo group; 73% of plantar fasciitis patients, who were limited in their sporting activities prior to RSWT, had no more limitations 12 months post RSWT. These results are significantly superior to the results of the placebo group where only every fourth patient showed an improvement at 1 year follow up.



Tab. 3: Plantar fasciitis	1 wk. follow up	4 wk. follow up	12 wk. follow up	1 y. follow up
Success rate (%)				
Verum group	74	88	82	79
Placebo group	44	36	38	25

Discussion: RSWT seems to be an effective treatment modality for recalcitrant Achilles tendinopathy and Patellar tendinopathy (Lohrer et al. 2002). Further controlled and randomised trials are mandatory to confirm these preliminary results. Radial Shockwave Therapy is an effective, non-invasive and economical treatment method for plantar fasciitis (Lohrer et al. 2001).

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