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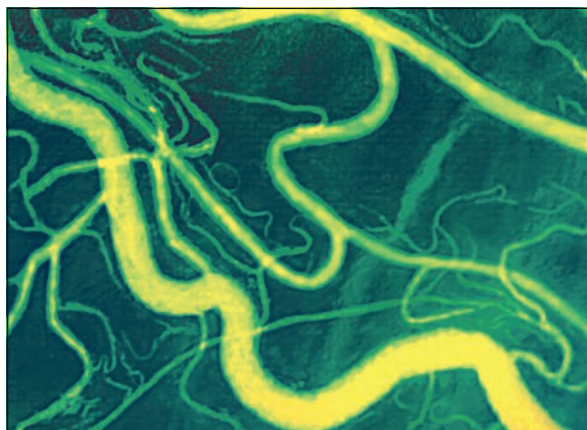
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“BEMER® Physical Vascular Therapy”

- ▶ The challenges of chronic illnesses
- ▶ New treatment option for chronic bone marrow oedema
- ▶ Physical Vascular Therapy in the surgical dentist's surgery
- ▶ The team player for every physiotherapist
- ▶ Improvement of parameters of type-2 diabetics
- ▶ International congresses on microcirculation in Taiwan, San Diego and Pisa



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Dear readers,

The International Microvascular Net (IMIN) picks up pace.

I have assumed the task of publishing this, the fourth edition of the “Physical Methods” report, in conjunction with the renowned Haug Verlag.

The focus of this report is on the synergy effects of research and therapy. Doctors and I are convinced of the globally increasing importance of and compliance with the different research results and possible therapies in the field of the improvement of microcirculation: Dr Burger – Pisa, Fred Unrath – Uni Regensburg, Dr Berka – MCS San Diego, Prof. Harms – World Congress Diabetes Taiwan.

This manner of thinking outside the box and the associated attention on the “Physical Vascular Therapy” option in order to optimise the microcirculation in line with requirements encourages further research.

Renowned scientists and users from the world of microcirculation research will

be presenting papers at the **First International IMIN Congress on 24.09.2016**

in the USA: additionally, the latest results pertaining to therapy-relevant data on “Physical Vascular Therapy” will be presented. Further IMIN congresses in Germany, Scandinavia and Hungary to be held in 2017 are in the planning stages. At the congress held by the Deutsche Gesellschaft für Physikalische Medizin und Rehabilitation e.V. (DGPMR), under the leadership of Prof. Dr Dr Fred Harms, a session will be devoted to the subject of “Physical Vascular Therapy”. The event will be rounded off with live performances of measurements of the microcirculation parameters using the LEA method.

At the same time, all doctors, pharmaceutical firms and medicine manufacturers are living with the challenge of complying with new legal rules since June 2016. Several positive elements can be derived from this development. With



“Change as a chance” as its motto, clarity and equality of opportunity in the market. Balanced, up-dated concepts will establish a further professionalisation of the fields of medicine and marketing in the future, for the good of patients and customers. With this in mind, I am looking forward to the new challenges, and send

Best wishes,

Fred Unrath

Executive Director IMIN
International Microcirculation Net

The Science Award 2015 goes to Prof. Dr med. Tamas Bender, Dr Katja Storch and Dr Ellen Dickreuter

Three researchers from Hungary and Germany have received the Science Award 2015 for their research work on “BEMER® Physical Vascular Therapy”. They are presenting new findings from the field of backache, arthrosis pain and cancer research.

An estimated seven million people in Germany alone suffer from chronic backache, six million from arthrosis in the knee joint, four million from polyarthrosis and 1.5 million from inflammatory rheumatic illnesses. Many of these common illnesses are caused by a dysfunctional microcirculation or, at the least, unfavourably influenced by such. The BEMER devices improve the impaired vasomotion of the small and very small vessels. This results in blood distribution in the microcirculation system in line with requirements. This makes BEMER an effective option for the treatment of many indication fields, and offers both clinical and basic research a further field of activity which is being discovered by an increasing circle of renowned scientists.

And so, during the Baden-Baden Medical Week, the Science Award for research work on “BEMER® Physical Vascular Therapy” was once again awarded in 2015. On 31.10.2015, in cooperation with the Haug Verlag, the Ärztesgesellschaft für Erfahrungsheilkunde e.V. invited all congress attendees to the Medical Week to attend the prize-giving ceremony.

Congress director **Dr med. Hans-Peter Friedrichsen** thanked the around 180 participants for their interest, and emphasised that the research work on “Physical Vascular Therapy” was being presented with the Science Award for the fifth time in succession.

This award is presented jointly by the Ärztesgesellschaft für Erfahrungsheil-



Fig. 1 Winner of the Science Award 2015: Prof. Dr med. Tamas Bender, member of the Hungarian Academy of Sciences.

kunde e.V., the Haug Verlag, the IPO – International Prevention Organization and, for the first time, the new International Microvascular Net, the IMIN.

At the start, Fred Unrath (IMIN) expressed his thanks for the tirelessly active Ms Caroline Augspurger-Hacker and her team for their exceptional dedication to the organisation of the get-together events in recent years, at the same time pointing out his early days as a constant exhibitor of the BEMER Group over the past almost 20 years.

In his function as Vice President of the I.P.O. Brussels, Prof. Dr Dr med. Fred Harms was the presenter for the evening in his witty, fresh manner, making frequent references to his personal experiences with the award winners.

Prof. Dr med. Tamas Bender, chief physician at the Hospitaller Brother of St John of God-Head in Budapest and member of the Hungarian Academy of Sciences, was awarded the prize for a rando-

mised, controlled, double-blind pilot study of 50 patients with painful arthrosis of the knee and 50 patients with chronic lower back pain. The Physical Vascular Therapy or a placebo device



Fig. 2 Dr med. Hans-Peter Friedrichsen, executive chairman of the Ärztesgesellschaft für Erfahrungsheilkunde.



Fig. 3 Dr Katja Storch and Dr Ellen Dickreuter.

without any effect was used in combination with physiotherapy over a period of 15 sessions, one a day. The study showed that “BEMER® Physical Vascular Therapy” was able to reduce the pain and fatigue of patients with chronic back pain in the short term, while the long-term therapy for patients with knee arthrosis proved to be beneficial.

The data was peer reviewed and published in May 2015 in the Journal of Evidence-Based Complementary and Alternative Medicine.

The two up-and-coming young scientists Dr Katja Storch and Dr Ellen Dickreuter received the second research prize. The scientists are part of the re-

search group of Prof. Dr med. Niels Cordes, head of the group “Molecular and Cellular Radiobiology” at the National Center for Radiation Research in Oncology at the University Hospital of the Technical University of Dresden.

Their experimental work investigated the influence of Physical Vascular Therapy on the resistance of human tumour cells to radiation and chemotherapy. In this context, Physical Vascular Therapy was able to strengthen the cytotoxic effect of radiation. With concurrent BEMER Therapy, significantly fewer tumour cells survived the radiation. In addition, DNA damage to the tumour cells was proven to be significantly more frequent. If such effects can be confirmed clinically, Physical Vascular Therapy could be part of cancer treatment in future. In any case, the results were intriguing, and research into the use of BEMER therapy in cancer treatment will continue in Dresden.



“The wellness market is booming, and this is the perfect occasion for using essential medical topics in the high-end hotel industry.

The competence and credibility of physicians is essential – these are the most important prerequisites for targeted prevention. The measures must be scientifically founded and evidence-based. This was the condition for the creation of the “Medic Hotel” structure. This makes the establishment of a competence-based centre for active vascular health based on the optimisation of microcirculation in the form of the Spirit Hotel in Bad Sárvár an even more joyful and important event. With this move, the establishment is initiating an international top-notch structure...”

Eitel J. Vida

IPO – International Prevention Organization

Spirit Hotel awarded the “Signum Virtutis”



At the Seven Star Global Luxury Awards, the five-star Spirit Hotel in Sárvár was presented with the “Signum Virtutis” award. The seal of quality for excellence is awarded to the most excellent representatives in the gastronomy, hotel, travel and service sector and is one of the highest recognitions presented with the luxury award. The winners were chosen by the public, based on the evaluation of a commission of experts – in addition to the recognition by experts, it displays an important response from the general public.

Microcirculation – the Important Key Factor

Microvessels are undisputedly an important factor in the overall course of vascular diseases as well as in the consequences of various diseases such as diabetes mellitus.

In recent years, research has revealed findings which have resulted in the development of solutions in therapy and through to the most important approaches in the field of prevention through to aftercare. These findings are multi-layered, and enable various ways of optimising microcirculation.

Centre for active vascular health

It is against this background that the high-end “Spirit” hotel in Bad Sárvár, Hungary, has established itself as a medically-managed “Centre for active vascular health”.

Medical competence is of the utmost importance in this respect. The basic structure of the services is based on several pillars:

- ▶ Individual anamnesis, diagnostics and combined therapy, plus
- ▶ Controlling and prevention

Several competence institutions were involved in the establishment of the centre. The statements of important opinion makers demonstrate the importance of microcirculation on the health of civilised societies:

“Human health in civilised societies is changing dramatically. Cardiovascular diseases and – as a precursor to this – dysfunctions of the microcirculation system – lead the pack. The major changes both result in major requirements made on therapy concepts which are preventative in nature and which offer treatment options.”

The modern key therapy

“The base of this therapy has now been researched in many centres, and offers diverse opportunities for optimising the microcirculation system, including in conjunction with individually prescribed therapy combinations.”

Prof. Dr Dr
Fred Harms
Sigmund Freud Uni-
versity Vienna



“The eight Capiro vascular centres in Germany treat over 30,000 in-patients and out-patients annually. This includes many patients suffering from open leg ulcers (ulcus cruris) and other circulatory problems. In order to provide more efficient, conservative treatment of the ulcer patients, the equipment procured includes the BEMER vessel-stimulation devices. This has enabled us to successfully expand the range of therapies we can offer...”

Martin Reitz
Chief Executive
Officer, Capiro
Deutsche Klinik GmbH



“Lack of oxygen, excess oxygen radicals and lack of reduction equivalents for the neutralisation of harmful metabolism intermediate and final products are the main causes behind many degenerative (chronic, civilisation-related) illnesses and lack of well-being. The effect of somatovital therapy is seen to work in the remedy of such. Along with the Physical

Vascular Therapy for activating the microcirculation system it – using its applications of spiro, dermo and gastro vitalisation – is the perfect combination for preserving and retrieving health and quality of life. The implementation of these findings is in the establishment of a scientific, competence-borne centre for vascular health to the same extent as it is realised in the establishment of Medic Hotels (Spirit Hotel in Sárvár).”

University professor
Dr med. Klaus Jung
University of Mainz



“Arterial stiffness – this form of vascular stiffness of the arteries causes a multitude of risks and generally is the basis of complex, problematic vascular diseases. The measurement of the pulse wave velocity using the “Arteriograph®” offers a fantastic method of practically detecting the development of risks in good time and to counteract them by means of suitable therapy measures. It is great news that the “Spirit Medic Hotel” uses this diagnostic measure, in addition to many others, in order to obtain an individual overall picture...”

Dr Johannes Baulmann
President of the De-
GAG – Gesellschaft für
arterielle Gefäßsteifig-
keit e. V.



Further information

IPO – International
Prevention Organi-
zation
www.ipo-web.org

The Challenges of Chronic Illnesses

The significance of relevant complementary technologies for the purpose of self-management by patients with chronic illnesses

Prof. Dr Dr med. Fred Harms

Do we have too many or too few health providers? Is our medical care efficient, or are we squandering our future? Do we need more innovations or more generic approaches? Should the state regulate everything? Can and must every individual assume greater responsibility, including of a financial nature? These and similar questions have been the subject of controversial discussions for years, resulting in answers which could hardly be more divergent.

The starting point is more than unambiguous – in the 19th century, 80% of all people died from infectious diseases, and this figure was still almost 50% as recently as in 1930. In contrast, only 1% of all people in Germany, Austria and Switzerland have been dying of these acute diseases since 1980. Hence it can be established that acute care has been learned and that it works (apart from a few exceptions which the media flogs to death in order to discredit the health system and those involved in it as a whole).

Yet: people continue to die. However, the reason for this has changed completely in the course of only half a century: It is no longer wars, epidemics and injuries which are accountable for most lethal events. Instead, nine out of 10 people in the industrial nations die from chronic illnesses.

Twenty-five percent of all people in Germany suffer from chronic illnesses. An estimated seven million people suffer from chronic backache, six million from arthrosis in the knee joint, four million from poly-arthritis and 1.5 million from inflammatory rheumatic illnesses. 3.5 million people suffer from depression requiring treatment, 1.4 million suffer from dementia, 1.2 million from Alzheimer's, and 800,000 from schizo-

phrenia. Every year, 300,000 people suffer a heart attack, every two minutes somebody suffers a stroke, every year the number of Type-2 diabetics increases at the rate of a city the size of Karlsruhe, and every year a population the size of Hamburg dies of cancer. The geriatrification of our society means that, in the next 20 years, the number of patients suffering from cancer and Alzheimer's is set to double, and the number of patients in need of care is expected to triple.

Despite this morbidity and mortality which have undergone a total revolution compared to just a few decades ago, the health system has been trying for years and decades, with the aid of a multi-billion investment, to counteract the epidemic of chronic illnesses by means of the good care approach which works well in the field of acute illnesses. And – failed! It's just that nobody has dared to come out with it. The blame is not to be found at the feet of the health insurance funds, the doctors or any other medical professionals who all want the best for their patients. Instead, it is a traditional (not wrong!) care approach that is to blame: it works really well in the field of acute illnesses but cannot be transferred one to one to chronic illnesses.

Care of acute versus chronic illnesses

Where is the crucial difference between the care of acute and chronic illnesses? A distinctive characteristic is the extent of the influence that the patient has on their recovery or the success of their therapy. The patient has comparatively little influence on their recovery in the case of acute illnesses. Such a patient depends on an effective antibiotic or a

good surgeon, for instance. In these classic examples, the doctor needs to explain to the patient exactly what medicine, above all, can do for the patient. Further communication comprises essentially communicating to the patient what they have to do or avoid over and above the medical therapy measures – a process which is totally appropriate for the care of acute illnesses and which has proven its worth. The role of the patient: it is down to the patient to decide whether or not they wish to be treated accordingly.

However, needs have changed fundamentally over recent decades. These days, the main complaints for which patients go to doctors' surgeries and hospitals are back pain, cardiovascular diseases, Type-2 diabetes, depression and smokers present with COPD (chronic obstructive lung disease) or a mixture thereof, i.e. multi-morbidity. This means that GPs in particular spend up to 85% of their time attending exclusively to these five illnesses. A new feature of this morbidity setting is that it is not the doctor that exerts the greatest influence on the success of the therapy, but rather the patient themselves.

The ability to promote self-management by patients with a chronic illness demands an extensive care concept which equally includes all medical professionals including patient organisations, health insurance funds / the sector. Communication with patients in particular requires a re-think. It is no longer a case of simply prescribing medicines; rather, a case of a fundamental understanding for the attitudes, worries and needs of the patient.

Hence: unless we focus our interest on the patient, the five most common illnesses which currently account for 88%

of today's costs – not to mention human suffering – will develop into the climatic catastrophe of our national economy.

Microcirculation and vasomotion – healthy organs and functional tissue

The microcirculation system comprises all transport phenomena of the mass exchange and the humoral information between the “organ” of blood and the cells of the other organs, including the cellular and humoral immune response. All processes happen on the “transit routes of the mass exchange” in the fine-tissue area of arterioles, venules, capillaries and the initial lymph vessels. Due to these factors, the microcirculation system is the functionally most important part of the blood circulation and its importance for our health is clearly visible.

A multitude of illnesses are caused by dysfunctions to the microcirculation system or, at the very least, are influenced by them during their course. Within the microcirculation system, the local regulation mechanism of the spontaneous, autorhythmic vasomotion in the arterioles and venules close to the capillaries which, quasi as pulsatile components, influences the separation phenomena between blood plasma and blood cells and, hence, the separation

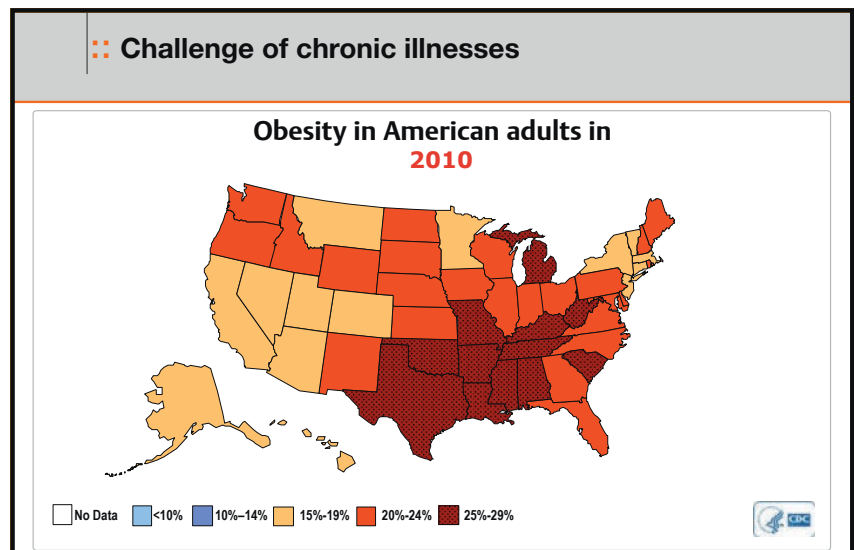


Fig. 5

state of the blood in the microvascular networks, is of elementary importance. One way of therapeutically influencing a dysfunctional microcirculation is to restore a “normal”, spontaneous autorhythmic vasomotion rate, since this is subject to a clinically relevant restriction in the case of permanent strain on the organism.

Scientific evidence on the efficiency of the BEMER treatment

By using the BEMER systems with additional signal for stimulating the vasomo-

tion, the following changes to the characteristics of the microcirculation system were proven: the increase of a prior lower rate of spontaneous vasomotion waves, increased arteriolar and venular flow, increased number of blood cell-perfusing capillaries and the hence improved distribution state of the blood in the microvascular network, multiplied venular oxygen exploitation and effective influence of immunological behaviour characteristics of leucocytes, multiplied adhesion and transmigration. Today, the BEMER technology and its use by means of specific application systems is an effective, targeted, physical treatment method for illnesses with a dysfunctional microcirculation.

Since pharmacological interventions are extremely limited, especially in the field of small-calibre arterioles with autorhythmic vasomotion, the “BEMER® Physical Vascular Therapy” is a treatment option for the improvement of the microcirculation system which has practically no competition. If you consider that a dysfunctional microcirculation has been established as the cause of numerous vascular illnesses and unfavourably influences many common illnesses (back pain, diabetes Type-2, cardiovascular diseases, etc.), the medical as well as the economic importance of this complementary therapy concept becomes apparent. Although the medically rele-

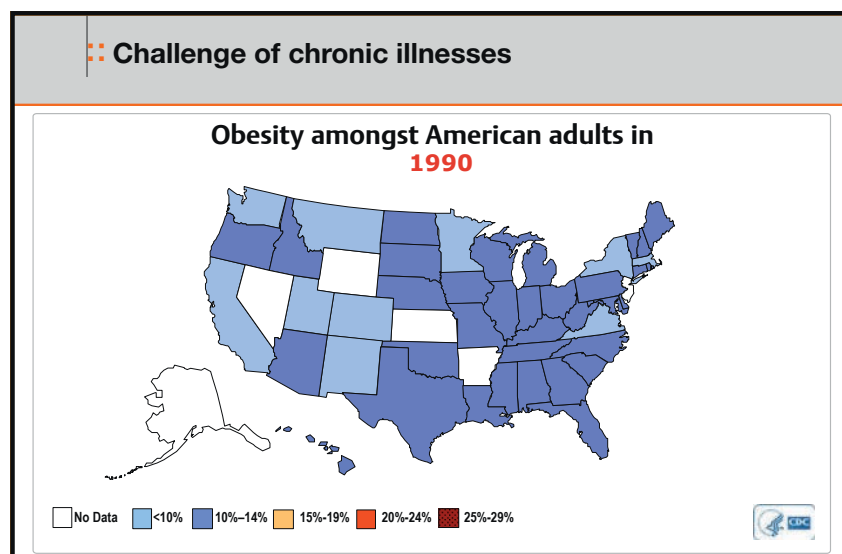


Fig. 4

Challenge of chronic illnesses

Situation in Germany

We need exactly three years to “re” populate a city the size of Hamburg with patients with Type-2 diabetes and cardiovascular diseases.



Fig. 6

vant effects of the “BEMER® Physical Vascular Therapy” do not imply a substitute for established treatment concepts, they present an effective, therapy-optimised complementary method for numerous indications / indication fields.

What does the market have to say about it?

As part of the legally prescribed market observation of certified medicine products carried out during the period between April 2011 and March 2013 using 658 validated patient questionnaires, it was ascertained that, based on three scientifically acknowledged scales for evaluating

sleep disorders (the Jenkins Score) and pain intensity according to Borg and the SF12 for presenting the physical state of health (life quality), a significant betterment of clinical/psychological parameters was recorded in all areas. With the patient collective, 72% of those asked suffered from complaints to the support and locomotor system. In the case of 48% participants of this investigation, of which over half (approx. 70%) had been experiencing the symptoms for over a year, an improvement to the state of health was recorded. A partial improvement was observed in a further 20% of the patients.

Summary

From this aspect, two-thirds of all users benefitted from the “BEMER® Physical Vascular Therapy”. This result documents what it is possible for patients provided with relevant technologies and the initiative to manage their own illnesses under the patronage of a trained therapist to achieve if they take the initiative. This is precisely where the future of our health system lies. It is precisely at this interface that BEMER Int. AG in Liechtenstein is making a constant contribution towards improving patients' care.

Prof. Dr Dr med. Fred Harms is a physician and biochemist. Together with Prof. Dr Dorothee Gänshirt, he manages the Institute for Health Communication and Research into Care at Sigmund Freud University in Vienna.

He has been the vice president of the European Health Care Foundation since 2005. The main emphases of his work include innovation management in the fields of medicine, direct patient communication, compliance management. The expert for health management is the author of 220 publications and book chapters as well as a speaker at international congresses.

He is also a member of the New York Academy of Sciences, of the High-Technology Entrepreneur Post-Graduate Program and the Society for Marketing Advances.



Systemic Endothelium/Lymph Therapy Using the “BEMER® Physical Vascular Therapy”

Dr med. Rainer Pawelke

The technological patented “BEMER® Physical Vascular Therapy” is systemically effective, and is based on the endothelium-mediated effect of processes dependent on NO (nitrogen monoxide) [1]. Scientifically endorsed, the reduced vasomotion rate of small and very small pre-capillary arteriolar vessels significantly improved in the capillary networks of the microcirculation [2]. In recent years, in the face of a growing number of relevant symptoms, a dysfunction in the area of the microcirculation system has been determined as causal and has been scientifically confirmed. This includes diabetes mellitus, overweight, high blood pressure, ageing processes, inflammatory intestinal diseases, dementia, rheumatological symptoms, ischaemic cardio conditions, nicotine abuse [3]. This also includes in particular morbid dysfunctions in the entire lymph vessels [4].

What is the endothelium?

The endothelium is a single-layer union of cells which lines the vascular inside wall of arteries, capillaries, lymphatic vessels and veins. It functions as a biological network system (biological sensor and signal giver) as a reaction to all internal and external influences and is co-responsible for the adequate provision of energy to approx. 80 billion cells. With regard to its coordinating overall functions, the endothelium is a systemic organ. Its functional integrity is decisive for the development and differentiation of the entire vascular and lymph system. The main tasks of the endothelium comprise:

- Regulation of haemostasis (coagulation and counter-coagulation),

- Immunomodulation,
- Vascular dilation regulation,
- Vascular growth processes,
- Vascular leakproofness,
- Remodelling and apoptosis processes [5].

Furthermore, the integrity of the endothelium is essentially determined by its protective layer – the glycocalyx [6]. In this way, today the decisive pathophysiological processes are localised on the way to arteriosclerosis in the field of glycocalyx dysfunctions [7].

In the case of chronic lymphatic illnesses, initial endothelial processes are equally affected [8,9]. Early scientific data regarding the systemic effectiveness of the signal configuration of BEMER® in the area of the lymphatic system are visible in [10]. The scientific data to this effect are multiplying:

“The functionality of the smooth vascular musculature in the lymphatic system is their key function! This intrinsic contraction character of the smooth vascular musculature – the “inner lymph pump” – represents the principle mechanism for the generation of an adequate lymphatic fluid drainage... and this process can be “influenced” by physical signal rates” [9].

Pilot study on leg lymphoedema

The current data encouraged me, as part of my scientific therapeutic activity at the Wittlinger Therapiezentrum Walchsee, Tyrol, to pose the following question: Can a NO-mediated improvement achieved by means of the use of the “BEMER® Physical Vascular Therapy” for leg lymphoedema improve the vasomo-

tion and reduce oedemas in patients with leg lymphoedema? We investigated this in 10 patients in the form of a pilot study in 2015 by posing the question: “Does the BEMER® Physical Vascular Therapy influence the reduction of oedema in addition to the established lymph therapy (CPD) as part of a three-week intensive therapy?” Findings: yes, significantly in all the examined parameters:

- Lymphoedema volume reduction,
- HADS Score (Hospitality-Anxiety-Depression-Score),
- Laboratory data: CRP, interleukins IL6, IL8, TNF-alpha [11].

These results encouraged us to design the first lymph study anywhere in the world to check the positive effect of the BEMER® therapy on the dysfunctional lymph system. This **BEMER® lymph study** was designed as a double-blind, randomised, placebo-controlled study of 208 patients and was authorised by the Ethics Commission in Innsbruck.

Summary

The endothelium is a systemically operating organ. The integrity of the endothelium depends on the integrity of the glycocalyx.

The adjuvant therapeutic success of the systemically effective “BEMER® Physical Vascular Therapy” is based on the systemic endothelium-mediated effectiveness of NO-dependent processes. Significant improvements with the “BEMER® Physical Vascular Therapy” amongst patients with leg lymphoedema are examined and checked by means of the BEMER® lymph study in the Wittlinger Therapiezentrum Walchsee, Tyrol.

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Dr Rainer Pawelke is an internist. Following various stops along the way, such as the medical director of the Akupunkturzentrum Bad Aibling, conceptual design and realisation of the first endothelium acupuncture study in cooperation with Herzchirurgie Großhadern, many years' cooperation and co-founder of Water4Life Foundation e. V. Own private practice since 2008. Lecturer both at home and abroad, including on the subject of endothelium protection.



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Migraine in Daily Therapy

Dr med. Ulrich Selz

Migraine is an exceptionally common complaint. Doctors, non-medical practitioners and other therapists are frequently faced with limited treatment options. Real experiences demonstrate that a multi-modal treatment approach which includes the BEMER technology can be successful. Although expert associations categorise migraine as an incurable neurological illness with genetic causes, patients are repeatedly reporting on the most divergent of treatment approaches have frequently resulted in the success of the therapy, even if this contradicts the existing expert opinion.

In fact, it is almost always possible to improve the state of migraine patients by means of consistent diagnostics and the treatment of triggers and trigger factors. The pure administration of pain relief to the patient does not actively change the state of health of the affected person: instead, it only has a reactive effect on the occurrence of the pain.

Improving microcirculation in the brain

The role of the supply of blood in the brain during a migraine attack has been scientifically acknowledged since the 1980s. Once the excitation front has passed through the brain, the brain cells fall into a state of lethargy. During this phase, inflammation and pain transmitters are secreted such that the blood vessel walls become inflamed. This is what

causes the pain. Consequently, a dysfunction of the microcirculation system occurs. This causes the attack and the aura to form. The brain cells receive too little oxygen and nutrients, which means that they can no longer perform their function. Speech disorders, visual defects, auditory losses and even paralysis can occur.

Observing the remote effect of organs

Many female sufferers of migraine actually suffer from a luteal insufficiency (hormonal weakness of the ovary) and, hence, from a lack of the hormone progesterone. The female menstruation is the bleeding caused by hormone withdrawal, triggered by the considerable decrease of the progesterone level. This causes the blood vessels to contract and the mucous membrane of the uterus bleeds out. Similar effects appear to influence the circulation of the vessels in the head, which results in cycle-dependent migraine. Natural hormone therapy can provide relief.

In the meantime, the importance of intestinal bacteria has also arrived at the universities. In particular, the human microbiome is being researched in depth at the University Clinic in Heidelberg. An overgrowth of the intestinal flora with putrefaction bacteria such as *E. coli*, enterococcus or clostridia results in the increased release of biogenic amines such as tyramine or histamine. These vasoac-

tive substances can cause or worsen a migraine. A consistent flora clearance can help many migraine patients in this manner.

The supporting search for and treatment of causes and triggers is, from my point of view, the imperative basis for the success of the migraine therapy.

The BEMER technology provides an important component within a multi-modal therapy concept. It starts with the restoration of the impaired microcirculation.

This results in the improved excretion of numerous pain transmitters and chemical messengers during the migraine attack. Furthermore, the supply of the brain cells with oxygen and nutrients is once again guaranteed. These effects are also observed in all organs. The "BEMER® Physical Vascular Therapy" should never be used as a single therapy – instead, it should be seen as an important option in an individual therapy for combatting migraine.

Dr med. Ulrich Selz works as a registered doctor in with his own practice in Ingolstadt, and has been concentrating on the treatment of chronic illnesses such as migraine for years.



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New Treatment Option for Chronic Bone Marrow Oedema

Dr Dr med. Richard Westhaus

Bone marrow oedema (BMO) owes its name to its morphological image in the magnetic resonance tomography (MRT). Thanks to the high-resolution imaging, BMO can be detected very easily in the MRT only upon its pathogenesis. Every form of BMO starts out acutely. However, in most clinical cases, the diagnostic imaging comes too late, so that the acute phase has passed and the diagnosis of a BMO is usually only made in its chronic stage. The typical signal behaviour is highly sensitive, yet non-specific, and occurs with many clinical pictures (box 1). The high signal intensity in the MRT is caused by increased extracellular fluid (oedema).

Pathogenesis

Irrespective of its origins and pathogenesis, due to its volume, every oedema is accompanied by the compression of its smallest arteriolar and venular vessels and, hence, impaired circulation. The re-

sulting deficient microcirculation results in a focal hypoxaemia which, in turn, favours the activity of the osteoclasts. Furthermore, a loco-regional acidosis establishes itself which also aids the metabolism of the osteoclasts and inhibits the osteoblasts. The osteoclast is therefore afforded a decisive role in the pathogenesis, supported by the release of inflammatory cytokines (prostaglandins, Interleukin1, $\text{TNF}\alpha$), (Fig. 7).

Symptoms and forms of BMO

At the forefront of the clinical symptoms is pain. This is, on the one hand, the consequence of the increased intraosseous pressure of the BMO and, on the other hand, caused by the exposure and irritation of nerve fibre ends in the bone marrow / tissue. The secretion of cytokines contributes to a BMO taking on a life of its own over the long term. The patients complain about therapy-resistant pain

Aetiology

I. Ischaemic BMO 35%

- chronic regional pain syndrome-CRPS (M. Sudeck); osteonecrosis; osteochondrosis dissecans

II. Mechanical BMO 35%

- post-traumatic BMO ("bone bruise"); insertion tendopathies; stress fracture

III. Reactive BMO 15%

- BMO with arthrosis, post-operative BMO (iatrogenic); BMO with arthritis and tumour

IV. Idiopathic BMO 10%

- earlier name: transient osteoporosis

V. Pregnancy-associated BMO 5%

- Third trimester; transitory osteoporosis

with massive restriction of movement in the affected joints through to immobility. Characteristic is the mechanical weight-bearing pain in conjunction with an excruciating, obtuse pain during rest / persistent pain. Box 1 reflects the current valid, accepted division into five groups separated aetiologically. The iatrogenic BMO as a special form of a reactive BMO is being increasingly and conspicuously frequently observed following the arthroscopic treatment of meniscopathies on the knee joint.

Therapy options

In addition to the consistent relief of the affected extremity, the pain treatment by means of medicine plays a decisive role. Lifestyle changes such as weight loss, a healthy diet, not smoking, are important adjuvant measures. Mindful of the central role of the osteoclast in the pathogenesis and momentum of the BMO, bisphosphonates (BP) are important, since they selectively inhibit the osteoclast and bring the bone metabolism into a new equilibrium. Additio-

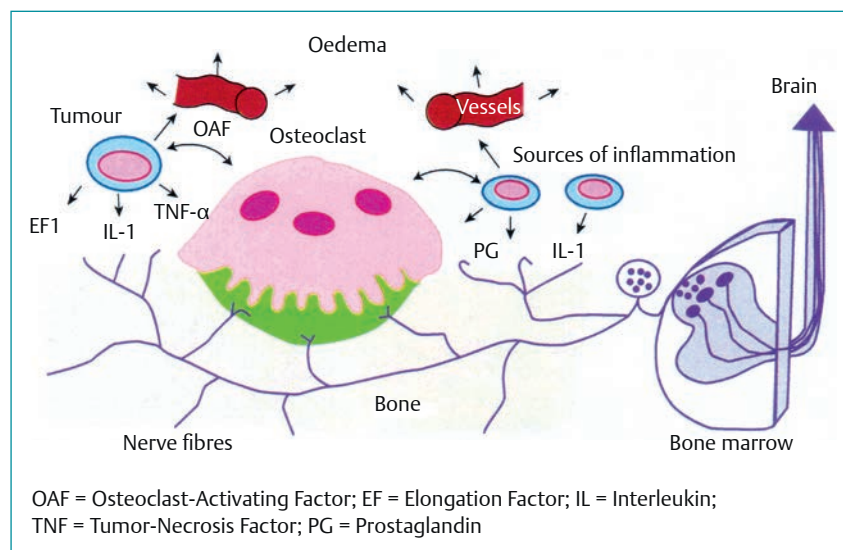


Fig. 7 Pathogenesis of the bone marrow oedema.

nally, the secretion of prostaglandin E and neuromodulators to the nerve endings is inhibited. Observation studies performed in recent years have proven the efficacy of an intravenously applied BP (e.g. 3 × infusion of ibandronic acid, Bondronat® 6 mg, every 4 weeks).

The use of BP is not authorised for treating the BMO (off-label use).

Observations made at the Bayerisches Osteoporose-Zentrum München, which is connected to our radiological institute, prove in part considerable side-effects of the BP therapy: flu-like symptoms with muscle and limb pain, increased temperatures and a feeling of malaise occurred in approximately 20% of the cases. The younger the patient, the more severe the side-effects.

Practice study with 95 BMO patients

Observations on 95 patients in our practice have accentuated the efficacy of the “BEMER® Physical Vascular Therapy” as a further therapy option for the treatment of the BMO. The therapy aims at activating the vasomotion of the smallest arteriolar and venular vessels in order to improve the deficient microcirculation in the bone marrow as an essential circulatory mechanism in the pathogenesis of the BMO. This is a non-randomised, non-placebo-controlled clinical observation study whereby the patients in question were informed in detail about the various therapy options (box 2) and, following careful consideration, they decided which option they chose.

Corresponding to the research results and in line with the recommendations issued by the Institute for Microcircula-

Tab. 1 BMO forms and affected physical regions of the 95 participants in the study.

BMO form	Number of participants in the study
ischaemic BMO	n = 43
Mechanical BMO	n = 29
Reactive BMO	n = 13
Idiopathic BMO	n = 8
Pregnancy-associated BMO	n = 2
Affected sections of the skeleton	
Knee joint (mainly medial condyle of the femur)	
Tarsus and metatarsus (especially shoulder of the talus, navicular bone, metatarsal bones)	
Head of the femur (pregnancy-associated form, necrosis of head of the femur)	
Vertebral body	

tion in Berlin, “BEMER® Physical Vascular Therapy” comprises 2 × applications daily using the full-body applicator (FB) for 8 minutes each at intervals of around 12 hours, complemented by as many local applications using the dedicated applicators as desired. The initial intensity on the FB generally amounted to 6–10 depending on the age, duration and pain intensity. For the local application, P3 was used for a duration of 20 minutes. The BEMER therapy proved itself as a successful, complementary therapy option free of side-effects for the treatment of the BMO.

The average observation period was 3 months. As part of the study, the patients were provided with the BEMER device for up to 8 weeks. Several of the patients decided to buy the device, others wished to test it within the framework of the clinical application. A second image was taken by MRT after an average of 10 weeks. In some cases, patients requested a sooner control after 4 or 6 weeks.

Depending on the duration of the illness, it took between 4 days (idiopathic form) and 3 weeks (CRPS) for the alleviation of pain and clinical symptoms to commence. A complete remission and freedom from pain was observed in 76% of the participants, the clinical course correlated with the complete regression of the BMO in the MRT. For the first time, this group included 4 adolescent patients between the ages of 11 and 16 by whom a drug therapy with BP is contraindicated due to the growing skeleton.

Fourteen patients (15%) reported sustained improvement to their pain, the BMO was considerably regressive in the control MRT yet still discernible. No improvement was observed in 6 patients (6%) with advanced arthrosis of the knee joint, since they showed no understanding for adjuvant weight reduction and intensive training therapy. In three cases (3%), the consistent alleviation of the affected joint was abandoned too early – in two cases, the BMO reappeared in the identical place, in one case the BMO moved from the medial to the lateral condyle of the femur (Fig. 10, Fig. 11).

Summary

The consistent and early use of MRT to clarify unexplained pain on the locomotor system of the lower extremities prevents the chronification of BMO syndromes, irrespective of their aetiology. Delayed diagnoses and therapies are accompanied by poorer prognoses, especially if a destruction of the osteochondral border area has occurred. Until now, therapy has been restricted to the consistent alleviation of the joint, pain killers, earlier decompression surgery on the affected osteochondral or enossal region and the intravenous administration of BP in off-label use.

“BEMER® Physical Vascular Therapy” has proven itself as a successful, easy-to-use treatment free of side-effects on almost 50 patients. Complete remission and freedom from pain, normal mobility and

Therapy options

- Mechanical relief by means of immobilisation
- Drug therapy: ASS, paracetamol and/or NSAR, in the individual case, corticosteroids
- Bisphosphonates
- Operations (decompression surgery)
- “BEMER® Physical Vascular Therapy”

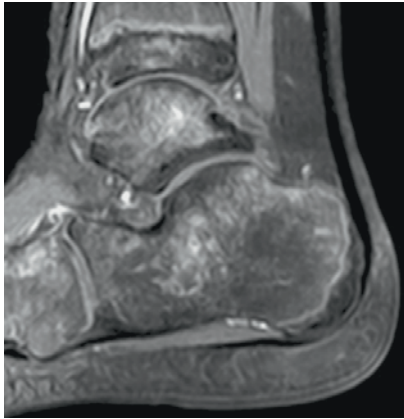


Fig. 8 MRT of a BMO of a 14-year-old patient before the BEMER therapy.

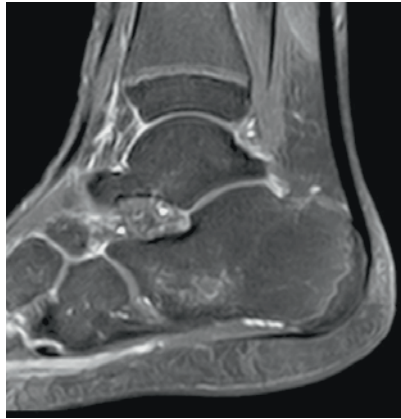


Fig. 9 MRT following the BEMER therapy.



Fig. 10 MRT of the left knee with BMO on the medial condyle of the femur before BEMER therapy.

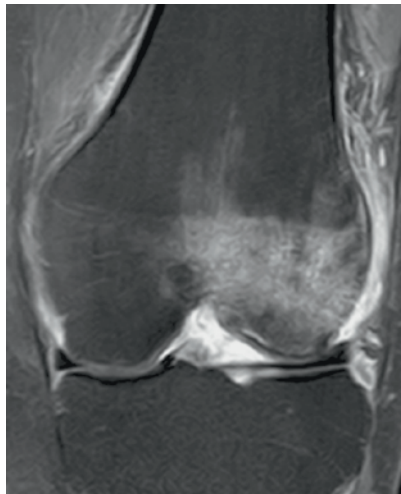


Fig. 11 MRT image following BEMER therapy: the BMO on the medial side has disappeared: due to lack of relief and alleviation; however, it has reappeared on the lateral side, yet with correspondingly migrating pain from the inside to the outside.

exercise tolerance as well as regression of the BMO in the MRT were observed in 80% of the aetiologically heterogeneous patient group. Compared to invasive therapy (decompression surgery), the recommended “BEMER protocol” to be used as an adjuvant is a valuable complementary therapy for more frequently diagnosed BMO syndromes.

The BEMER therapy can be used additionally to the intravenous administration of BP. Clinical observations have been on-going for several weeks now, and will be the subject of future publications.

Dr Richard Westhaus is internist and radiologist; study visits to the USA with training in computer and computer and magnetic resonance imaging; 1994–1995 head physician of radiology at Krankenhaus Pfaffenhofen/Ilm.

Own private practice at the Diagnostik und Vorge Zentrums DiVoCare in Munich since 2007.



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Microcirculation congresses in 2016/2017

Physical Medicine and Microcirculation
14.–16.02.2017, Spirit Hotel Bad Sauer, Hungary
Between Tradition and High-Tech Medicine – Specialist Conference by the DGPMR in conjunction with IPO/IMIN
Participation on request
Further information
www.imin-org.eu

ESM-EVBO JOINT MEETING 2017
29. May to 1 June 2017, Geneva, Switzerland
European Society for Microcirculation (ESM) and European Vascular Biology Organisation (EVBO)
Further information
www.esm-evbo2017.org

The Microcirculatory Society Annual Meeting at Experimental Biology 2017
22–26 April 2017, Chicago, USA
Further information
www.microcirc.org

35. Annual Conference of the Deutsche Gesellschaft für klinische Mikrozirkulation und Hämorheologie
4–5 November 2016, University Medical Center of the Johannes Gutenberg University Mainz
Further information
www.orbera.de

IMIN – International Microvascular Network
Scandinavia – Berlin – Munich – Frankfurt
Specialist conferences for vascular specialists in conjunction with expert associations
Further information
www.imin-org.eu

Experiences with the BEMER Therapy in the Urological Practice

Dr med. Michael Blessing

Casuistry 1: Chronic pelvic pain syndrome

The 58-year-old patient is a smoker, and has been suffering intermittently from Chronic Pelvic Pain Syndrome (CPPS) since 2003. The symptoms have been constant since 2006. I have been treating him since 2008.

The physiotherapy and osteopathy performed to date provided freedom from pain for two weeks after six months of therapy. Constant improvement yet no freedom from pain was recorded until January 2013.

Due to erectile dysfunction we commenced BEMER treatment. The patient was given eight treatment sessions in January 2013 (B.Body Programme 3, Intensive, B.Spot Stage 8 Intensive). At the closing consultation in February 2013 he said: "BEMER hasn't helped one bit." At a consultation in January 2014 he reported a complete lack of symptoms until November 2013! Following the reappearance of the symptoms, we once again performed the BEMER therapy. The patient hasn't been back to the surgery since that date.

Casuistry 2: Erectile dysfunction

The 74-year-old patient suffers from erectile dysfunction with a partial obstruction of a dorsal artery of the penis. Further diagnoses: atrial fibrillation (medication: Pradaxa), CHD. A sonography revealed three well-perfused arteries as well as good stimulation to Alprostadil.

The patient is treated with 10 sessions of BEMER therapy: daily, Programme 3, Intensive on B.Body and Programme 3 Intensive with the spot on the root of the penis plus adjuvant physiotherapy. The erectile function and general well-being of the patient improved significantly after just five sessions. The perfusion of the penile arteries remains unchanged at rest, the partial obstruction of the dorsal artery still exists.

The patient presents once again due to poor erectile function in July 2015. The repeated use of BEMER over a four-week period using the device twice a day at home again considerably improves the erectile function of the patient, who ex-

periences regular morning erections. The CHD symptoms also improved: he is able to walk and cycle further without experiencing shortness of breath. "I am faster than my wife again!"

Summary

Both cases demonstrate that complementary treatment using "BEMER® Physical Vascular Therapy" offers a practical addition to the therapeutic options offered by a urological practice.

Dr Michael Blessing is urology specialist. Further training in pain therapy, uro-cynaecology and andrology as well as in urological psychosomatics. Further specialities: men's health and burnout consultant.



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BEMER – Successful, Additive Application

Two examples from my practice

Dr med. Stephanie Bergmann

1. Case: Pain following burn

At the age of 11, the 51-year-old patient experienced massive burns, punctum ma-

ximum in the head and arm/hand area, in a car explosion during a traffic accident. Since then, she has undergone multiple operations (especially on the hands / stumps of the fingers and the face). Fre-

quent resections in the area of the finger stumps were performed due to the post-operative lack of soft tissue cover with protrusion of the bone. The patient also complained about:

- ▶ Latent permanent pain in the finger stumps (FS) (p.m. D2,3),
- ▶ Excruciating phantom pain (FS),
- ▶ Painful paleness or livid discolouration, especially in cooler external temperatures (FS),
- ▶ Wound healing disorders,
- ▶ Recurrent ulcers on the mucous membrane of the mouth (caused by restricted possible oral hygiene, due to difficulty opening the mouth caused by scarred strands),
- ▶ As a secondary finding, pain in the area of the lumbar spinal column in recent months.

In addition to osteopathy, acupuncture and specific pain therapy, the patient was given the complementary “BEMER® Physical Vascular Therapy”. For logistical reasons, this therapy was very soon performed at home.

After a total of 14 sessions (over three months) in my practice and the permanent use of “BEMER® Physical Vascular Therapy” at home, all symptoms were significantly improved, and the deep back pain was gone.

As a secondary finding, the patient reported a considerably better bowel movement behaviour.

This positive development continues to date, even without any further therapy in my practice.

2. Case: Joint injury with fracture

Following a hyperextension distortion trauma on her left foot, the 47-year-old patient suffered an injury to the Lisfranc joint and an MT-IV base fracture.

The initial therapy comprised immobilisation using a lower leg cast and complete alleviation using forearm crutches. In this case I also used a specific pain therapy as well as the “BEMER® Physical Vascular Therapy” with the B-Body as well as local applicators on the foot (cast). Using this therapy, the swelling went down extremely quickly so that, after only four days, the patient easily changed over to a Short walking boot with pain-adapted load structure through to full load within a week. The check-up X-ray after four weeks already

indicates a solid knitting-together of the fracture. She wasn't off sick one single day. The patient was able to go on her planned skiing holiday and experience it largely free of pain.

The foot is fully functional and free of pain even after almost six years.

Summary

The “BEMER® Physical Vascular Therapy” is the perfect complementary treatment in the range of therapies I offer.

Dr med. Stephanie Bergmann is a specialist in the field of surgery, and in the additional fields of manual medicine in sports medicine and acupuncture. In her practice for integral medicine and natural remedies, she combines classic medicine with integral approaches.



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BEMER PEMF Therapy in an Integrative Health Clinic Setting

Dr Kevin D. Shaw, ND, EAMP, Dipl. OM

Using the BEMER PEMF device in integrative primary care has afforded the opportunity to observe benefit of this non-invasive therapy in a wide range of clinical conditions. In our clinic, we have witnessed positive change in everything from musculoskeletal and neurological conditions to infectious disease processes. In some cases, the benefits have been life changing for the patient, providing great improvement in functional abilities that reduce limitations.

There exists in the literature studies which may confirm why BEMER PEMF is effective in specific clinical indications.

A few examples of clinical observations are provided with relevant references to research. Tab. 2 provides a list of conditions improved after addition of BEMER PEMF therapy to integrative treatment in our clinic.

In **diabetic neuropathy**, there is evidence in the literature that improvement in transcutaneous oxygen measurements corresponds with improvement in neuropathic symptoms. There also is data from prior experiments that shows increased partial pressure of oxygen after BEMER PEMF therapy. This is confirmed by the number of nodal points

containing red blood cells increasing as well, so that the diffusion time for oxygen to reach cells is greatly reduced. As would be expected from these findings, we have seen significant improvement in numbness, pain, and burning in patients with diabetic neuropathy who are using the BEMER PEMF in our clinic twice weekly.

In **idiopathic tinnitus**, it has been suggested that poor microcirculation, especially at terminal tracts of the ear, contributes to oxidative damage by free radicals. We have observed improvements in both decreased volume and frequency

of occurrence in idiopathic tinnitus patients that have used BEMER PEMF twice weekly. No additional antioxidant therapy was necessary.

We have also observed quicker than typical responses to integrative treatment of **viral conditions** such as Bell's palsy and shingles. See Figures 12 and 13. A combination of antiviral medication, antiviral herbal therapy, and acupuncture treatment was supplemented with BEMER PEMF and resulted in fast resolution (3 and 2 weeks respectively) of these conditions with no sequelae. In herpes simplex outbreaks that for one individual typically took 2 weeks to 1 month to fully resolve, the BEMER PEMF alone resulted in resolution after only 2 days and a single treatment. These observations may be the result of findings in the literature that shows accumulation of white blood cells following BEMER PEMF therapy.

A number of patients have had **post-surgical complications** lasting from months to years, including chronic pain, unresolved edema, internal adhesions, and fecal incontinence. These complications have subsequently resolved with 1 to 8 weeks of BEMER PEMF therapy twice weekly. We know that in wound healing, the transcutaneous PO₂ level can predict healing. The increase in PO₂ may help internal wounds to heal as well. Improvement in wound healing in elderly patients after BEMER PEMF therapy is also seen in the literature.

From a more cosmetic perspective, re-growth of hair has been seen on the legs, in a diabetic patient, and on the head, in

Tab. 2 Conditions improved by use of BEMER PEMF therapy.

Vascular • chronic venous insufficiency • erectile dysfunction • hypertension • lymphedema • post surgical edema • Raynaud's syndrome	Neurological • autism • chronic fatigue • fibromyalgia • migraine • multiple sclerosis • neuralgia • neuropathy • diabetic • chemotherapy • idiopathic • sciatica • tinnitus
Gastrointestinal & Urinary • fecal incontinence • inflammatory bowel disease • interstitial cystitis	Musculoskeletal • arthritis • muscle spasm • non-union fracture • tendonitis
Infectious Disease • Bell's palsy • herpes simplex • shingles	Ocular • cataracts • myopia
Mental Health • anxiety • depression • PTSD • sleep disorder	Dermatological • alopecia • eczema • psoriasis • warts • wound healing
Metabolic • gestational diabetes	Respiratory • COPD

a multiple sclerosis patient. After twice daily BEMER PEMF for two months, the MS patient received his first haircut in 5 years. The new growth on top is darker and longer. Certainly the microcirculation is key for hair growth and gives an additional visible sign of healing in the skin. In the literature, patients with alopecia areata have been found to have disturbances in the microvasculature.

A great potential for further research exists regarding the mechanisms of change with BEMER PEMF therapy in a wide variety of medical conditions. The results of this research will help increase physician awareness of this therapy and improve outcomes for more patients. I urge the medical community to consider that improvement in microcirculation may help them greatly in their area of specialization, as we have seen a wide variety of conditions responding in primary care.



Fig. 12 ■■■■■■■■
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Fig. 13 ■■■■■■■■
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Dry Macular Degeneration and Bemer Vascular Therapy

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The CDC (Centers for Disease Control and Prevention) notes macular degeneration is the leading cause of vision loss in the United States for people 65 years and older. With the continued aging of the population in the United States and Europe, AMD (age-related macular degeneration) will continue to affect a larger and larger number of people around the world. Presently AMD is considered an incurable disease.

Macular degeneration is a complex disease with many possible contributing factors. Genetics are a well-recognized risk factor. Other risk factors are controllable: smoking, being overweight, uncontrolled high blood pressure and cardiovascular disease. Long term exposure to sun light without eye protection can be another contributor.

The macula is the central area of the retina that is solely responsible for the ability to see fine detail. This is crucial for reading and driving. There are two types of AMD, wet and dry. 85–90% of AMD is the dry form. The macular tissue thins and begins to break down over time. A

very common appearance with the dry form is drusen. Drusen are yellow or white lipid (fatty protein) deposits under the light receptive part of the retina. When the drusen are scattered, small and hard (clearly defined) their presence are a lower risk factor for vision loss. However, “soft” drusen are typically larger, clumped closer together and significantly increase the chance of vision loss. This is the type of drusen we will be seeing in this case presentation.

Case presentation

Patient history

71 year old female. Five year history of AMD. Medical history: Hashimoto's thyroid disease for 20 years, gallbladder and appendix removed, Irritable Bowel Syndrome.

Best corrected visual acuity: Right eye 20/30-1, Left eye 20/30-1

Note the significant drusen deposits in the macular area of each eye (Fig. 14).

The extensive soft drusen is even more clearly seen by an OCT (ocular coherence

tomography) which gives a side profile of the macular area at a micron level (Fig. 15 and Fig. 16).

Fortunately the drusen has not significantly deposited under the central macula of each eye. However, prognosis is guarded with the large drusen on either side of each central macula.

Treatment

The retina has one of the highest metabolic needs of any tissue in the body. The macula has the highest metabolic need of the retina. The macula replaces cells every two days. The rationale to use Bemer vascular therapy was to attempt to increase micro circulation in the retina to see if this would help with the absorption of the drusen deposits. The patient started twice a day Bemer sessions at the end of October. The patient was next seen in our office 7 months later. Best corrected visual acuity: Right eye 20/20-1 (was 20/30-1 seven months prior).

Right eye shows significant improvement in drusen deposits and correspon-

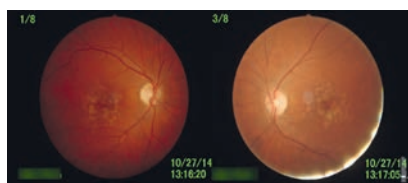


Fig. 14 Significant drusen deposits in the macular area.

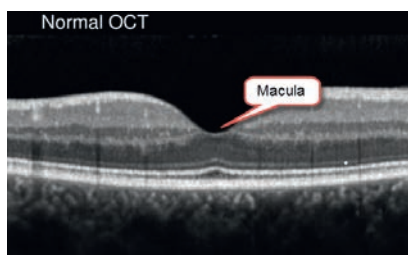


Fig. 15 Normal OCT.

ding improvement in visual acuity (Fig. 17). To see such significant resolution of soft drusen deposits is extremely rare. Though the right eye showed marked improvement in drusen reduction the left eye showed essentially no change (Fig. 18). The patient added an additional one month of Bemer vascular therapy with the Bemer Spot to the left eye but no further change was noted.

Discussion

As noted in the beginning of this paper, AMD is a complex disease with many factors contributing to the loss of macular function. This complexity of contributing factors is seen even within one patient. It is possible the long term thyroid disorder, long term digestive disorder and decreased ability to emulsify fats due to the removed gallbladder could have contributed to the drusen formation. What is unknown is why the right eye responded so well to the improved microcirculation and the left eye did not achieve the same results. Fortunately the patient's quality of life has improved with the increase in visual acuity in the right eye. The significant reversal of soft drusen is a very, very positive sign for the patient's long term macular health. The improvements documented above of drusen reduction are among the first reported in the litera-

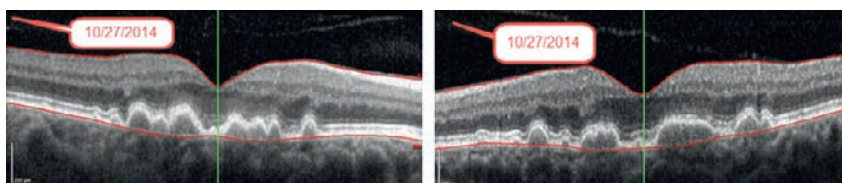


Fig. 16 The patient's OCT shows extensive soft drusen.

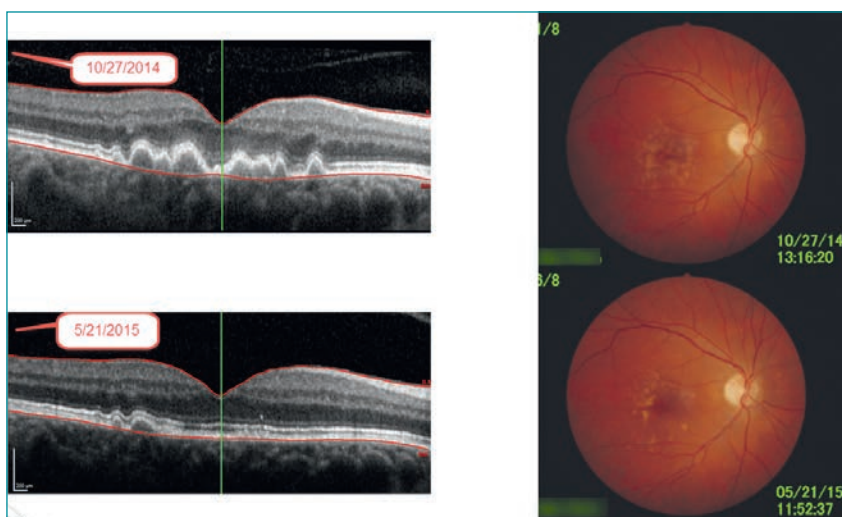


Fig. 17 The right eye shows significant improvement in drusen deposits and corresponding improvement in visual acuity.

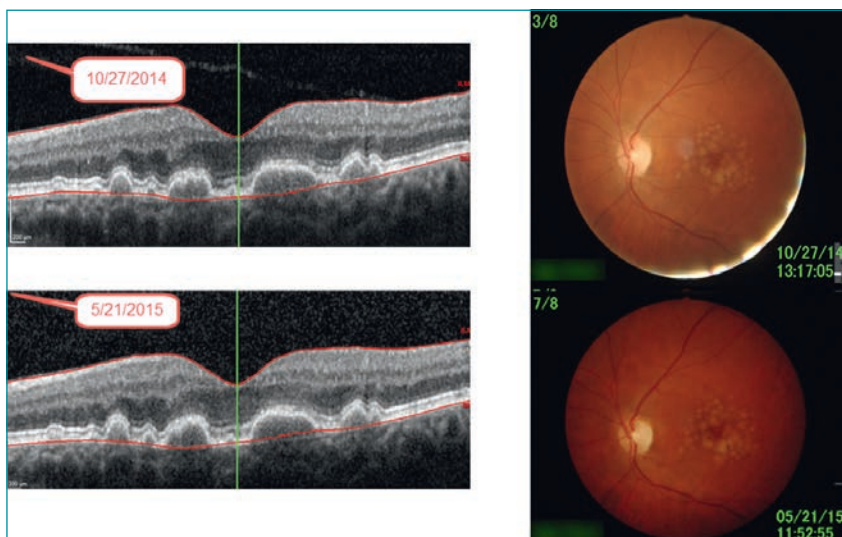


Fig. 18 The left eye showed no essentially change.

ture. Further studies are warranted to determine the affects of Bemer vascular therapy on additional patients with AMD.

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BEMER Application in Children's Mental Health

Susan G. Pickrel, MPH, MD

BEMER therapy's effects on microcirculation are well documented in the seminal and ongoing research of Dr. med. Rainer Klopp at the Independent Institute of Microcirculation in Berlin [1]. Dr. med. R. Klopp identifies the role of decreased microcirculation as a mediating factor in illness as well as an independent trigger for separate pathologic process. He indicates a range of suitable applications for BEMER therapy ranging from (a) preventive therapy to (b) complementary therapy in addition to traditional therapies to reduce amounts of medication and to treat symptoms [1]. The effects of BEMER therapy on the variety of symptoms presenting in children's mental health is an open question. How its application might influence amount of medication needed to control symptoms as well as the symptoms themselves prompted the current open trial of BEMER in children and adolescents. This report documents an ongoing observational study of the application of BEMER physical vascular therapy in a population of children and adolescents 4 to 17 years of age. Study is located in Springfield and Eugene, Oregon, USA in my consulting and private practice focused on child and adolescent psychiatry. To date N = 19 youth have been consented and participated in BEMER therapy. Parents, day treatment staff and children have reported on their experience and observations with BEMER. From these reports along with my own clinical observations I have generated what I refer to as emerging clinical pearls in relation to BEMER and children and adolescent's mental health presentation.

Clinical Pearl 1: Children and adolescents accept using the BEMER. Once they have tried it, they typically ask to

do it again. In our day treatment setting where it is available on a daily basis, children become agitated and upset and ask for the BEMER if they have missed it on a particular day.

Clinical Pearl 2: Every child and adolescent who experiences the BEMER shows an observable and often remarkable regulation of their affect. A child with an anxious or agitated affect has a clearly observed calming and a child with a flat or blunted affect has an appropriate energizing.

Clinical Pearl 3: When children use the BEMER they are able to regulate and mobilize their energy in a more focused and productive fashion. This includes both calming in the face of hyperactivity and energizing in the face of low and flat energy. It is dramatically reflected in their increased ability to complete school assignments in the day treatment setting with less or no prompting.

Clinical Pearl 4: Use of the BEMER in a day treatment classroom changes not only the outcomes for individual children but also decreases chaos and tension in the class milieu and stress level for children and staff. It has the additional potential to decrease workplace injury by decreasing children's aggressive behaviors and thus staff's risk of injury from these behaviors. In one case in this series a 7 year old boy broke the thumb of a staff member before BEMER was introduced into the classroom. The physically aggressive behaviors of this boy were present before using BEMER and decreased to gone when he used the BEMER daily in the classroom.

Clinical Pearl 5: Use of the BEMER alongside other therapeutic modalities is complementary and appears to facilitate the healing process and provide a shorter time to relief of symptoms. A

case example of this is a 17 year old female who had significantly shorter time to response to a combination of SSRI medication, cognitive behavioral therapy and BEMER for significant depression, generalized and social anxiety and post-traumatic stress disorder.

Three case examples from the Day Treatment Classroom illustrate these clinical pearls. All three children had been in the day treatment program for at least a year, had been on one or more medications with partial or minimal improvements in behaviors that had prompted their removal from a mainstream school classroom and still required 1 : 1 staff time for safety due to physical and verbal aggression and inability to complete academic work. Their diagnoses included attention deficit hyperactivity disorder, autism, language disorder, sensory processing disorder and fetal alcohol syndrome. They each received BEMER therapy delivered in the AM at the beginning of the school day, beginning with level 1, no plus, for 8 minutes and advancing one level weekly to level 5, all the levels with no plus. After level 5 they continued to cycle through levels 3, 4 and 5 weekly. The plus signal was noted to be too activating for each of them and so was omitted. All of these children showed observable changes in their target symptoms from the beginning to the end of their 8 minute BEMER sessions.

Case 1

Case 1 is a 7 year old boy with autism and symptoms of attention deficit hyperactivity disorder treated with buspirone and dexamethylphenidate. He was referred to day treatment because of hyperactivity disrupting class, physical and verbal aggression, inattention with

mental health difficulties appears associated with regulation of affect, energy and attention. Early observations in an open trial in a mental health day treatment setting also indicate associated decreased physical and verbal aggression and increased academic and social participation. The therapeutic milieu also appears affected with much calmer tone, classroom children appearing more focused and productive and staff and children subjectively reporting less

stress. This suggests that further observation and study is warranted as BEMER therapy has a potential to improve outcomes and complement other therapies in children's mental health.

Reference

- [1] [Klopp RC](#). Microcirculation in the Focus of Research. Abbott Printing: 2007; Chapters 25–28: Complementary physical stimulation of constricted or disordered microcirculation.

Contact

Dr. Susan G. Pickrel, MPH, MD is a board certified child and adolescent psychiatrist trained in functional medicine and practicing in Eugene, OR, USA.



BEMER Therapy for Cognitive Impairments

Dr med. Éva Csécsei

As part of a study, 27 patients at the Neurology Practice of the Medical Service for the Budapest district of Belváros-Lipótváros were treated with an individually adapted, complex BEMER therapy between the years 2009 and 2014. The 18 women and nine men aged between 48 and 87 years of age presented at the surgery with cognitive symptoms such as disturbances of memory, forgetfulness and dementia for out-patient treatment. Depending on their pertinent requests, and following examinations and the establishment of their current state of health, the patients were not administered with drugs for improving the bloody supply to the brain but rather were treated using the “BEMER® Physical Vascular Therapy”. Worth a special mention are the results of the therapy of a patient who, after two years of BEMER therapy, recorded an excellent improvement in her state of health during the performance of a medical examination.

Diagnostics

Psychological examinations

The patients underwent the following examinations:

- ▶ Mini Mental State Examination (MMSE) (dementia recognition test),
- ▶ Cognition test according to Addenbrooke,
- ▶ Beck scale,
- ▶ Clock test.

MMSE

Despite numerous restrictions and inadequacies, the MMSE has the advantage of the greatest international comparability and distribution. The test is also seen as an independent treatment option in the field of out-patient therapy.

This cognitive brief test from the 1970s is used both in the medical practice and in clinical psychology and neurology settings, mainly for the detection and assessment of the gravity of dementia. In the individual partial tasks of the test, orientation, attention, central realisation, the ability to establish quick associations and the ability to name, analyse and synthesise things are examined.

Value ranges:

- ▶ 30 to 27 points: normal state
- ▶ 26 to 20 points: mild dementia
- ▶ 19 to 10 points: moderate dementia
- ▶ 9 points and less: severe dementia

Cognition test according to Addenbrooke

The cognitive test according to Addenbrooke also includes the MMSE test. This test is sensitive to amnesic syndromes as well as to isolated and linguistic deficits.

Value ranges:

The measurements are taken in the value range between 0 and 100 points:

- ▶ Orientation: max. 10
- ▶ Attentiveness and mental flexibility: max. 8
- ▶ Episodic and semantic memory: max. 35
- ▶ Fluent verbal mode of expression, phonemic and semantic category: max. 14
- ▶ Aphasia tasks: max. 28
- ▶ Visio-spatial, constructive realisation: max. 5

Imaging methods

A magnetic resonance tomography of the skull was taken of each of the patients, in individual cases a computer tomography and in most cases a SPECT ex-

amination of the brain was performed. The SPECT examination (Single Photon Emission Computed Tomography) is a non-invasive medical imaging method using gamma rays. It is a functional imaging method, i.e. it is not the anatomical conditions but rather various functional characteristics of the brain (such as bloods supply and metabolism parameters) which are represented in a certain period of time. Changes to tissues and organs usually precede changes to the functional characteristics of the tissue. Anatomic degenerations of the tissue occur only as a secondary feature.

Applied therapies

The patients were given the following therapies:

- ▶ “BEMER® Physical Vascular Therapy”: at least 3 and no more than 5–7 therapy sessions per week. Therapy programme used: B.BODY 1-6, B.BODY 10, B.PAD P1-P3+ around the head.
- ▶ Individual cognitive training with regular check-ups.
- ▶ Lifestyle changes: exercise, a reduction to the blood pressure and blood sugar level, normalisation of the cholesterol level aimed for.
- ▶ Mental hygiene maintenance.

Findings

Initial examination

The following findings were made amongst the participants in the study at the start of the therapy:

- ▶ MMSE: 14–30 points
- ▶ Addenbrooke test: 60–100 points
- ▶ Skull CT/MRT: normal findings through to severe frontal, temporal atrophy as well as multiple vascular lesions

- ▶ CDS: normal findings through to moderate/severe atherosclerosis
- ▶ SPECT: different degrees of severity and different localised circulatory problems

Check-ups

Check-ups after two to four years indicated the following findings: Psychological examinations:

- ▶ MMSE: 17-30 points (Tab. 3)
- ▶ Addenbrooke test: 71-100 points (Tab. 4)

Psychiatric examination: improved psychomotor speed, thinking processes, attentiveness, emotional life, mood Brain SPECT: positive change to the circulatory conditions in the brain as well as reduced circulatory problems.

Case studies

Two cases are described in detail as examples of the possible successes of the therapy.

Case 1: 81-year-old patient

At the examination, the elderly, well-groomed lady displayed problems recalling recent events.

Tab. 3 Changes in the MMSE.

Degree of the change	Number of Persons
Distinct improvement ≥ 3 points	7
Moderate improvement of 1-2 points	11
Unchanged	8
Worsened	1

Tab. 4 Changes in the Addenbrooke test.

Degree of the change	Number of persons
Distinct improvement	7
Moderate improvement	9
Unchanged	9
Worsened	2

MMSE: reduction from 27 to 24 points in 5 years, Addenbrooke test: reduction from 79 to 60 points

Therapy: BEMER M1, P1-2 scarf under her head

The following values were recorded after two years: MMSE: 26 Addenbrooke: 71
Diagnosis: Mild Cognitive Impairment

Case 2: 57-year-old patient

The patient works as a secretary to a director general. She had been making mistakes in the past six months, a noticeable slowing down, forgetfulness and concentration deficiencies became apparent. She has difficulties finding the right words, is clumsy when typing and is now written off sick indefinitely. She has already applied for early retirement on the grounds of disability. The diagnostics come up with the following findings:

- ▶ MMSE: 26/30, Addenbrooke: 81/100
- ▶ Dysthymia, dysphoria
- ▶ Skull MRT: a deviation of the signal intensity as an intracerebral symptom of an illness was not detectable. Signals indicating morbid tissue, diffuse signal obstruction from existing lesions are not detectable.
- ▶ A SPECT examination of the brain was performed.

In the image taken in 2010 (Fig. 20), circulatory problems are detected both in the rear scala and bi-frontotemporal (reduced reception during activity). The stem basilar parts demonstrate an unequally reduced activity. Indirect signs of an incipient cerebral atrophy.

The patient was given a neuro-protective infusion therapy: however, no actual improvement was ascertained.

A progression was ascertained in the frontoparietal areas and bitemporal in the SPECT check-up examination in 2012 (Fig. 21) compared to the findings from 2010. The activity of the brainstem is low, the structure irregular. The bi-frontotemporal activity displays a distinct left-sided emphasis and biparietal a left-sided emphasis, reduced in limited areas. The markedness of the lumpy structure, which indicates an encephalopathy, is also advanced.

Definition:

Mild Cognitive Impairment (MCI)

- ▶ Memory problems, confirmed by relatives, can be proven by means of objective examinations.
- ▶ Overall, the intellect has not been affected.
- ▶ Dementia is not present (MMSE > 24).
- ▶ No disruptions to daily activities.
- ▶ Mild Cognitive Impairment is considered a risk factor for vascular or Alzheimer dementia.

After this time, the patient no longer accepted any drug therapy: however, she agreed to a BEMER therapy.

Following the initial, extremely fast improvement of her well-being and general state of health, she purchased her own device which allowed her to apply the therapy every day over the long term.

The BEMER therapy was applied 3 times a day for 2 years (mat applicator in accordance with the basic plan and B.PAD applicator P2-3+ around the head). Additionally, attended language courses and undertook exercise therapy as the basis of the therapy.

The SPECT examination of the brain carried out as a check-up in 2014 showed an improvement which correlates with the improvement of the clinical symptoms (Fig. 22).

The cerebral activity and the activity of the brainstem basal parts have been maintained. Cortically, with the exception of the occipital region, the distribution of the supply of blood is slightly irregular. A circulatory structure indicating a vascular encephalopathy is currently present. Compared to the findings in 2012, a considerable improvement to the vascular components of the encephalopathy is detectable.

Psychological check-ups:

- ▶ Normal psychomotor speed.
- ▶ Unimpaired thinking, from the point

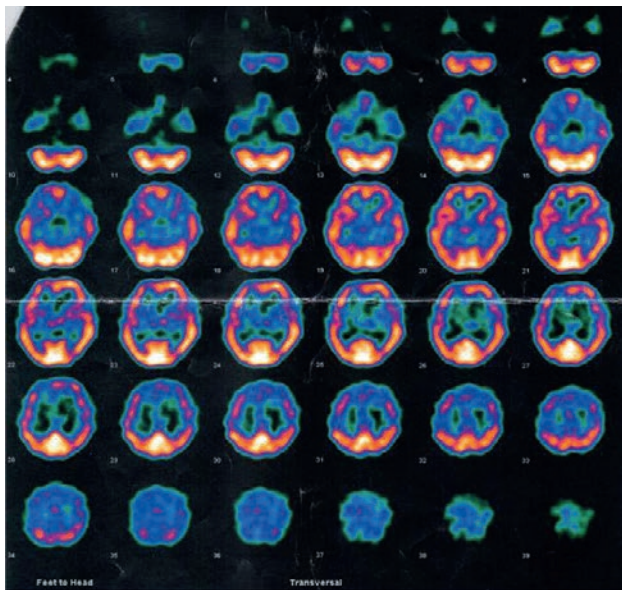


Fig. 20 SPECT image from 2010.

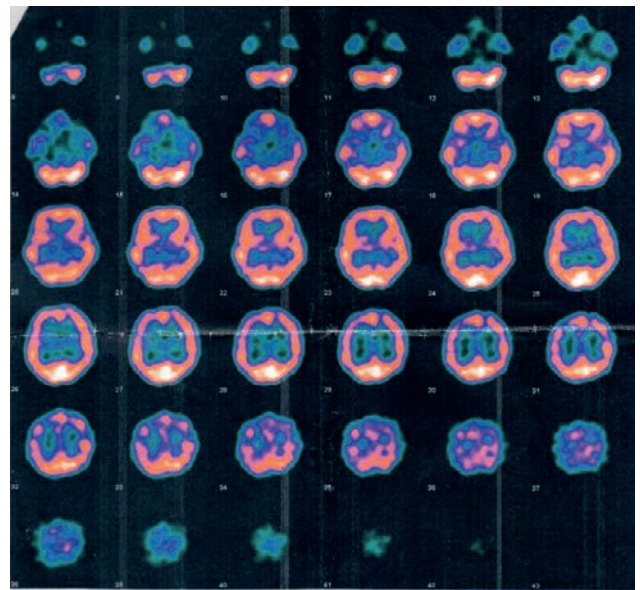


Fig. 22 Check-up SPECT image from 2014.

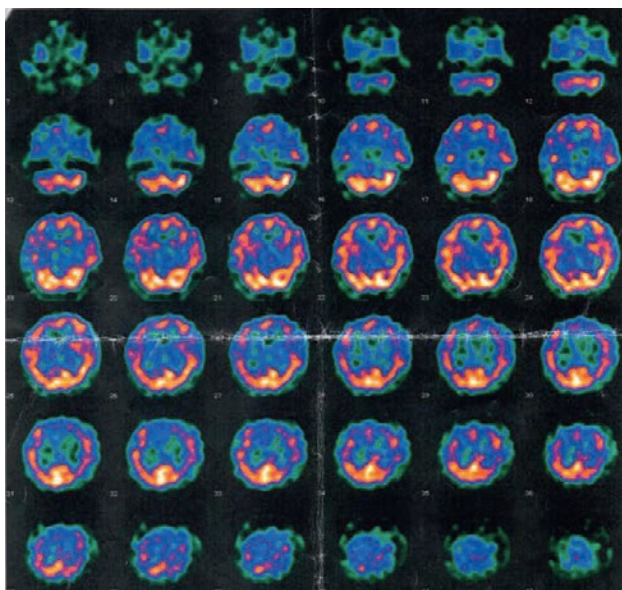


Fig. 21 Check-up SPECT image from 2012.

of view of both form and content. Euthymia.

- Mnestic-intellectual functions have been preserved.

- MMSE: 29/30
- Addenbrooke: 89/100

Summary

The memory is the most human mental function. Memory impairments can manifest themselves in various psycho-pathological contexts (key symptom – peripheral phenomenon). As a rule, they are part of a complex group of symptoms which has many aetiopathogenic implications and prognostic consequences. BEMER therapy can play a role in the effective treatment of such. The positive role of learning both in prevention and in therapy is worth a special mention.

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Physical Vascular Therapy in the Surgical Dentist's Surgery

Dr med. dent. Armin Diermeier

The efficacy of the “BEMER® Physical Vascular Therapy” as an adjuvant component for chronic degenerative and chronic inflammatory illnesses as well as for silent inflammations is undisputed and scientifically appraised. Many of these illnesses are caused by a dysfunctional microcirculation or are unfavourably influenced by it during the course of the illness.

The “BEMER® Physical Vascular Therapy” has no competition for complaints accompanied by a dysfunctional microcirculation.

In the field of dentistry too, we observe in chronic periodontitis which occurs in phases, chronic diseases of the mandibular joints or chronic face pain, positive improvements in the complementary medical use of the BEMER therapy. Although the Physical Vascular Therapy achieves such excellent therapy success in the cases of chronic illnesses, we cannot ignore the positive effect achieved in the treatment of acute illnesses.

In the field of the surgical dentist's therapy, we use the BEMER for the post-operative care of (wisdom) tooth operations, implant operations, cyst operations, mucous membrane operations and in the adjuvant therapy of wound healing disorders following bisphosphonate therapy.

The following case of the exposure of a retained, upper right canine tooth of a 16-year-old patient is an example of the pain-relieving, detumescent effect of the BEMER therapy. It considerably promotes the physiological healing of the wound, wound healing disorders following operations, of which we experience sufficient in our practice in earlier days, are therefore a thing of the past.

The illustrations 23 and 24 show the intra-operative exposure of the retained

tooth. Illustration 25 documents the surplus dental germs.

The post-operative BEMER therapy effectively promotes the healing process with a fast reduction in the post-operative swelling (Fig. 26) and, hence, also the post-operative pain.

The healing of the wound occurred free of complications (Fig. 27) which meant that the orthodontic care could be started soon after.



Fig. 23



Fig. 24



Fig. 25

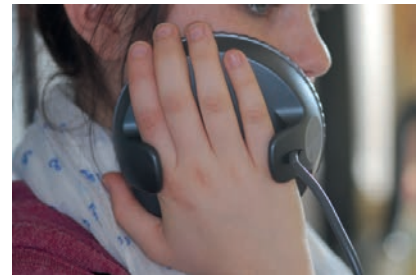


Fig. 26



Fig. 27

Dr med. dent. Armin Diermeier has been working in his own surgery since 1994. Specialities: surgery and prosthetics; since 2007, establishment of a group practice with extended range of dental services. Use of the physical regulation therapy for well over 15 years, consultant physician and speaker for “BEMER® Physical Vascular Therapy”.

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The Team Player for Every Physiotherapist

Options of an effective additional service
by means of the “BEMER® Physical Vascular Therapy”

Jürgen Patock

Physiotherapy, with its various options, is an effective support mechanism in the healing process for many patients. Sometimes, however, it comes up against limiting factors when it comes to efficiently influencing metabolic processes. In this respect, many measures cause secondary changes, especially when the learnt exercises are performed independently both regularly and frequently enough.

In a one-in-one situation with the patient, therapists frequently wish for an immediately effective and direct support option in order to increase metabolism situations. The used classics are still heat and cold applications in their various forms.

In the past two decades, medical technology has developed modern methods and produced corresponding devices. The prices for such are in the region that it makes it impossible for therapists to buy and operate them from a purely economic point of view, since the remuneration for such from the health insurance funds are simply too low. This includes for instance devices in the field of so-called cryotherapy which work with new methods as well as with intricate light therapies, laser devices, ultrasound methods, extra corporal shock wave therapy, etc. The market is huge, and is frequently confusing. This is further complicated by the fact that these methods are frequently restricted to a few diagnoses.

BEMER in therapy

We have been using the “BEMER® Physical Vascular Therapy” in our therapy centre since, and have realised that never before have we had a system that has offered so many various applications and demonstrated such a diverse effect.

The application has proven a true team player which positively supports all types of sound therapy. Following a pre-treatment with the BEMER system, for instance, and the associated improved microcirculation, greater efficiency in the degree of mobilisation and reduced pain, for example, become evident in the application of manual-therapy measures – it is only this improved situation which enables certain strokes in the first place.

Pain can be alleviated in medical training units. Following training, the BEMER application is extensively responsible for achieving regeneration much sooner.

In the case of neurological symptoms, the therapist is helped to release spasticity or simply to provide the patient with more encouragement in their walking endeavours. Subsequently, the therapies experience a greater level of acceptance amongst patients.

In the case of therapy on children, our therapists frequently observe greater concentration which contributes towards considerably more efficient therapy units and better results.

Prescribability and remuneration

Basically, the therapy to be additionally prescribed should be prescribed as a so-called **adjuvant remedy** by the doctor treating the patient. This is possible in the case of most cardinal symptoms listed in the official catalogue of remedies for the physiotherapy industry. Depending on the cost bearer (statutory health insurance fund, pension fund, professional association or private insurance fund), the remuneration per unit amounts to between € 4 and € 7.

If the physiotherapist is also a sectoral non-medical practitioner (restricted to

the field of physiotherapy), the doctor doesn't need to prescribe the therapy.

In this case, the therapy can be used independently by the therapist. Then the patient can – and should – be charged privately in accordance with the medical fee schedule for non-medical practitioners. Possible rates amount to between € 10.50 and € 20.50.

Further options for the therapist

The “BEMER® Physical Vascular Therapy” is also indicated for home application in most cases. In such cases, the physiotherapist takes on a consultative role.

Payment for this service is made directly by BEMER Int. AG. Incidentally, reimbursement is way above the rates usually paid by the statutory health insurance funds. The therapist receives payment according to performance – a good chance for establishing a secondary source of income in their own practice/in their jobs. Over and above that, there is the chance to work as a medical product consultant or medical speaker for BEMER Int. AG.

Summary and prospects

The increasing recognition of the “BEMER® Physical Vascular Therapy” in the field of medicine is a lucrative field of activity for the innovative physiotherapist. Therapeutic interventions and economic aspects are united as one.

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Microcirculation Research I – Physical Vascular Therapy Improves Parameters for Type-2 Diabetics

Congress paper from the Word Health Conference in Taiwan by
Prof. Dr med. Rainer Klopp, Prof. Dr Dr Fred Harms

Prof. Rainer Klopp (head of the Institute for Microcirculation in Berlin, Campus MaxDelbrück Zentrum Berlin-Buch) and Prof. Fred Harms (Medical Director of the International Microvascular Net, Brussels) were invited to the Board of Trustees at the Third Global Health Conference in Kaohsiung Exhibition Center in Taiwan in November 2015 in order to report on the work of the Institute for Microcirculation headed by Prof. Dr med. Rainer Klopp.

The reason was the publication of the research results by the Institute for Microcirculation on the effect of the physical stimulation of the spontaneous arteriolar vasomotion for improving the microcirculation and the immune system of patients with Type-2 diabetes and wound healing disorders in an article in the Journal of Gerontology & Geriatric Research.



Fig. 28 Prof. Dr Rainer Klopp, head of the Institute for Microcirculation, Berlin.



Fig. 29 Prof. Dr Dr Fred Harms, Vice President of the European Health Care Foundation.

At the congress, Prof. Harms presented more extensive study results on the changes of the functional condition of the microcirculation and their therapeutic influence on patients with Type-2 diabetes by means of a placebo-controlled, blind study (n = 60). Not only the latest findings on physical vascular therapy were discussed with the international audience of experts – the entire session entitled “Inflammation and Wound Care in Diabetes” was headed by Prof. Fred Harms.

Increased microcirculation thanks to BEMER Vascular Therapy

In the study, connected microvascular networks (arterioles, capillaries and venules) with a total tissue volume of 3,000 pm³ were captured and the following changes to their characteristics were measured: The number of the blood cell perfused nodal points (nNP) in a defined microvascular network is taken as the standard for the state of distribution of the blood. Furthermore, the venular oxygen depletion (ΔpO_2) is represented. This shows the ratio of the metabolised oxygen as a standard for the metabolic activity depending on the organ function. Furthermore, Qrbc was determined as the parameter for the distribution of the blood, the so-called flow force of microcirculation.

Mainly in the group of patients who, twice a day for 60 minutes, took moderate exercise on a treadmill (comparable to a walk) subject to the conditions of hyperoxia (26% oxygen ratio in the room air) and were conditioned with the additional use of the physical vascular therapy (12 minutes, stage 3), a considerable improvement in the named microcirculatory parameters in the range of 30–50% was achieved.

Physical Vascular Therapy reduces the risk of long-term damage

With regard to the clinical relevance of these results, the following conclusions can be formulated: “BEMER® Physical Vascular Therapy” significantly improves the physical performance of patients with Type-2 diabetes.

It reduces the susceptibility to infections thanks to an improvement in the microhaemodynamic constraints / influences the microcirculatory range for the exchange of mass in dependency with the physiologically relevant requirements of the organ metabolism in a positive way. These results once more emphasise the relevance of the adjuvant physical vascular therapy. This applies particularly to Type-2 diabetics that have had the condition for years and wishing to avoid the consequences of multi-morbidity.

Microcirculation Research II – Joint Meeting in Pisa 2016

Dr med. univ. Ralph Burger

It was in the direct vicinity of the leaning tower of Pisa that almost 300 scientists and clinicians came together at the Joint Meeting of the European Society for Microcirculation (ESM) and the European Vascular Biology Organisation (EVBO). The latest research findings pertaining to microcirculation research were discussed in the lecture halls of Polo Carmignani at the University of Pisa. The pioneering event conveyed an insight into the latest research results and showed the attendees the importance of microcirculation for the challenges faced by the health system.

The occasion further gave the attendees the opportunity to meet representatives of other organisations, such as the International Microvascular Net (IMIN) and to find out about possible cooperation options for establishing future-oriented therapy and treatment concepts.

Prof. Pier Luigi Cuolantoni, Italy, opened the congress with an impressive presentation on the milestones of the research into arteriole vasomotion and the regulation of the microvascular flow of blood. He provided an overview of the findings since the first description by T.W. Johns in 1853. The decades-long research has extracted ground-breaking results and yet the most fundamental secrets have still not been unearthed. The precise information dynamics have still not been completely explained: “Although the long story, the regulation of blood flow distribution is still under debate,” is how Prof. Cuolantoni finished his explanations.

Every day, 2,000 patients in Germany, Austria and Switzerland are confronted with the diagnosis of diabetes type-2 or a cardiovascular disease. The resulting

microvascular changes implicated by these two illnesses alone make it clear to all clinicians and health economists that microcirculation and the regulation of the circulation of the micro-circulatory networks will have an immanent aspect for effective, sustainable health management.

Prof. Roy Huben, Holland, stuck his finger in precisely this wound, pointing out which nature future challenges will take on. The microcirculatory flow motion influenced and controlled by vasomotion indicates various adaptation phenomena in obesity and hypertension. In a major study of the population, 10,000 test people (5,000 type-2 diabetics and 5,000 non-diabetics) were tested to see which cardiovascular risk factors have an influence on the microvascular flow motion. Whereas obesity indicates an evident reduction of vasomotion and, hence, of the flow motion, both factors increase considerably in the case of hypertension. In both cases, a progressive deficiency of the adequate and needs-based microcirculatory cellular supply of organs is indicated. This cellular supply is indispensable for the optimum functioning of the organs and the endothelium which form the basis for vasomotion in order to have the flow motion function.

Prof. Christian Aalkjaer presented the molecular function parameters which are important for triggering the vasomotion. The uncoordinated reaction of the endothelium cells is synchronised in a local depolarisation at a certain point, and triggers the endothelium-mediated tonus regulation which can then be presented as vasomotion. This proves that vasomotion is an autorhythmic, local

phenomenon. In vitro, the researchers have proven that the stimulation of the depolarisation of the endothelium cells is possible via chemical as well as by physical stimulants.

Medicinal as well as physical approaches towards the therapy of vasomotion disorders are currently under discussion. Medicinal approaches are a main priority of the current research. However, they are vulnerable in one important point: in order to take effect, they depend on the microvascular distribution mechanism of the patient, which is restricted anyway, and appropriate receptors in the precapillary, arteriolar section. This receptor deficiency presents a not insignificant hurdle for an efficient medicinal therapy.

The “BEMER® Physical Vascular Therapy” would appear to be the more promising approach for closing this therapeutic gap. As an adjuvant therapy optimiser for diseases accompanied by a reduction in the vasomotion and microcirculation, the physical mechanism of action and the proven effect on restricted vasomotion appear as an established and effective therapeutic instrument.

Relevant microcirculation therapies will be a key for future health management in order to effectively and sustainably counteract chronic diseases and their influence on microcirculation: in a therapeutic yet above all in a preventative setting.

Dr. med. univ.
Ralph Burger



Microcirculation Research III – Conference of Experimental Biology in San Diego 2016

Dr Joshua Berka, NMD

We have some great news coming from the USA. Dr. Joshua Berka NMD, attended the Experimental Biology (EB) Conference in San Diego, CA to explore the most current scientific research in the field of Microcirculation.

While Microcirculation was only a small part of this year's EB Conference, there are exciting discoveries that are being made, allowing for a deeper understanding of the microvasculature and its function. Blood Cell-Microvessel Interactions have been of great interest over the years in research and continue to be at the forefront of research.

Dr. Klaus Ley, MD and his team at La Jolla Institute for Allergy and Immunology presented their latest findings related to the role of adhesion molecules in neutrophil mobility within the vessels. His team studies inflammation and the cells and tissue involved with the process. The roles of adhesion molecules in acute and chronic inflammation have been investigated using both in vitro and in vivo models. Klaus states, "The ultimate goal of the research is to develop methods to control negative side effects of inflammation by influencing leukocyte adhesion to the endothelium".

Alan Burns, PhD and his team from the University of Houston followed up by presenting a deeper look at the contributions of microvascular inflammation in wound healing.

Signal Integration and Microcirculatory Blood Flow Control

Throughout the conference, there were various presentations on signal integra-

tion and microcirculatory blood flow control. One thought provoking presentation was delivered from Steven Segal, PhD., from the University of Columbia, titled *How does Blood Flow and Where to Go*. "Our research is focused on understanding the control of tissue blood flow in light of how oxygen delivery increases in response to metabolic demand", says Segal. His team studies the molecular physiology of vascular cells using methods such as electrical and optical monitoring of cell signaling and intravital video microscopy.

Vasomotion

A true pioneer in the field of microcirculation was also present at the EB conference. Dr. Ivo Torres MD, PhD is a research physiologist in the Damage Control Resuscitation Program at the US Army Institute of Surgical Research in Houston, TX. Dr. Torres was involved in the early research of microcirculation and vasomotion. He and his team studied "bat wings" to learn more about vasomotor function and its involvement in micro-hemodynamics. He was presenting his most recent research and the role of the endothelial glycocalyx in maintaining function and structural integrity of the vasculature.

Pericytes

An emerging area of interest among researchers is the role of pericytes in maintaining circulation.

Pericytes are contractile cells that wrap around the endothelial cells of capillaries and venules. These cells are embed-

ded in the basement membrane where they communicate with endothelial cells of the microvessels by means of both direct and paracrine signaling. There is increasing evidence (although controversial) suggesting that pericytes may regulate blood flow at the capillary level. In the brain, it has been reported that neuronal activity increases local blood flow by inducing pericytes to dilate capillaries before upstream arteriole dilation occurs. Amanda Pellowe, of Yale University, presented the most recent research on the regulation of Pericyte contractility decreasing barrier function during inflammation. "The more I study these cells, the more intrigued I become with what they do", says Pellowe.

Microcirculation remains a field of study that affords opportunity to gain a deeper understanding of how blood flows and how it is regulated. While many of the mechanisms that control microhemodynamics remain elusive, scientists and researchers continue to study the structure and function of our microvasculature to better understand the details of how blood flows and where it goes.

Dr. Joshua Berka, NMD



Microcirculation Research IV – Inaugural IMIN Conference in Orlando, Florida 2016

The fields of science, medicine, engineering and technology increasingly reach far beyond laboratories, healing, and inventions. Pulsed Electromagnetic Field Therapy (PEMFT) is on a path to finding its way into mainstream medicine. Scientists representing an array of disciplines, engineers and medical professionals were invited to the 1st International Microvascular Net (IMIN) Conference in Orlando to collectively discuss the safety and efficacy of Pulsed Electromagnetic Field Therapy.

Introductory remarks by Conference Chair Dr. Ulises Baltazar welcomed more than 1,300 participants at the 1st IMIN Conference and an additional 300 viewers of the streaming live webcast. Mr. Frederic Unrath, IMIN President, provided context for the conference with an introduction to IMIN and a review of its goals. Consider Professor Ivo Torres Filho, physiologist and biophysicist, whose research helped understand physiological mechanisms taking place at the microcirculatory level in health and disease. A key and unique component of his approach is the integration of traditional systemic physiological parameters, blood biomarkers, and microvascular variables such as microvascular permeability, leukocyte- and platelet-endothelial

interactions, and local blood flow measurements in addition to in vivo glycocalyx determinations. The focus of this work is on translational physiology with main questions related to treatment of ischemia and shock, primarily on mechanisms at the level of the microcirculation.

Dr. Rainer Klopp shared remarks on selected biophysical, physiological, pathophysiological, and therapeutic aspects of the microcirculation as the focus of his research. His research on the biophysics of micro- versus macro-circulation activation has advanced the field in a measurable way. A review of diagnostic technology to evaluate microcirculatory function was provided by Mr. Thomas Derfuss. Dr. Joshua Berka traced the evolution of PEMF Therapy in science and medicine while an in-depth discussion of microcirculation as the cornerstone of life was led by Dr. Ulises Baltazar. The effects of dysfunctional circulation on cardiovascular health were defined by cardiologist Dr. Robert Chesne.

Inflammation triggers several profound effects on vascular pathology and chronic disease. Current PEMF Therapy applications as clinical tools in Integrative Medicine were reviewed by Dr. Sunil Pai. The retina and macula in the eye have

the highest metabolic need of any tissue in the body, literally situated within a sea of blood vessels. Dr. Todd Wylie shared case studies and his clinical experience with PEMFT application effects on vision. Finally, emphasis on maintaining and sustaining structural integrity and optimal function of the arterial system was demonstrated by Dr. Carey Benenson-Taussig.

Going forward, Unrath said much work will go into the efforts of what scientists consider to be the potential for safe and efficacious use of PEMFT. There is not yet a strong empirical understanding of what some scientists believe the benefits of PEMFT to be. That will come in the next few years or so, Unrath added, when ongoing clinical and scientific results are analyzed and available as educational materials to inform physicians and scientists beyond applications of traditional therapies for the wellbeing and health benefit of individuals.

Further information

Proceedings of the 1st IMIN Conference is available for download at www.imin-org.eu

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Physical Therapy of Microcirculation Dysfunctions – Medical Training in Physical Vascular Therapy

Dr med. Monika Pirlet-Gottwald

Chronic illnesses and metabolic disorders and their consequences such as dysfunctions to the microcirculation system, “silent” inflammations or deposits of metabolites in the connective tissue with degenerative metabolism processes are taking up an increasing amount of space in the working life of the GP. In addition to the necessity of the treatment with drugs, the importance of the lifestyle factors of exercise, a sensible diet and a healthy work-life balance for healing and health has been proven in many epidemiological studies.

Hence, the focus of medical attention and research is increasingly turning to physical methods for therapy in the field of primary and secondary prevention. Non-specific physical stimuli and adequate functional requirements such as aerobic exercise, nerval stimuli (acupuncture, neural therapy), weak light, heat or cold stimuli (red light, fango) improve the cardiovascular regulation, circulation, microcirculation and the regeneration processes of the cells.

In particular, the specific effects of pulsed electromagnetic fields for the microcirculation system are the subject of many research projects [6]. The special signal configuration, as used in the BEMER therapy devices, improves the

microcirculatory extent in a unique manner. Restricted vasomotion phenomena, oxygen depletion are increased to a therapy-relevant extent [4].

Acute local circulatory problems in the field of orthopaedics and surgery are undoubtedly a grateful task for the application – however, the Physical Vascular Therapy proves itself especially in the **long-term systemic application for chronic internistic symptoms**. The regular, low-dosage use results in significant improvements to the most important parameters of the microcirculation system, and the clinical successes can be attributed to the reactions in the interstitial space of the intermediary metabolism. Due to the high efficacy and the complexity of the metabolic effects, medical supervision is necessary for serious illnesses and metabolic disorders.

Well-founded, medical training and further training is necessary for the qualified application. Illustrations 30–35 provide a brief overview of the further training.

The approx. three-hour “**Medical Workshop**” provides an initial, general introduction. This workshop demonstrates the importance, areas of application and options of the “BEMER® Physical Vascular Therapy” in practical circumstances

in order to enable commencement of the successful therapy.

A **2-day Basic Academy** serves the purpose of a better understanding of the physiological and pathophysiological backgrounds of microcirculation, therapy and to consolidate safe application. The main topics are:

1. Microcirculation and vasomotion as the basis for the sufficient supply and disposal in the end vessel system. Effects on the transit route in the intercellular matrix, especially of the mesenchymal connective tissue. What happens in the protein turnover intra and extracellular? All causal healing processes are to be found in the protein-molecular structure. With the discovery of the ubiquitin system as a targeted depletion of aged and defective protein molecules, the team of researchers headed by Ciechanova, Hershko and Rose have succeeded in displaying the foundations for regeneration and restitution processes and earned the Nobel Prize for Chemistry for their work [3].

This turnover decides the function and performance quality of the cells in all organ systems [7] and requires an adequate supply of all necessary energy sources, components and co-factors via the intra- and extra-cellular metabo-

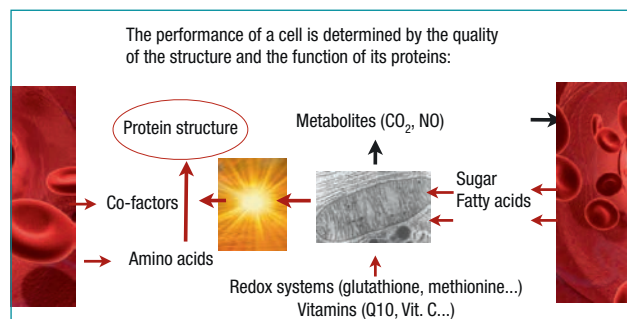


Fig. 30

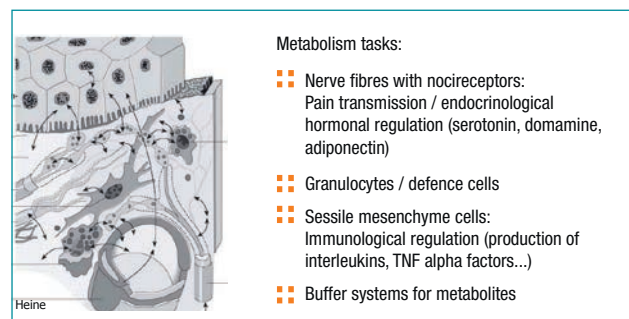


Fig. 31

lism. That is why microcirculation in the surrounding mesenchymal tissue is increasingly gaining the attention of research (Fig. 30).

There is no organ system without mesenchyme tissue! Sessile mesenchyme cells form the walls of the cardiovascular system (the vascular endothelial cells), the epithelial cells of the respiratory tracts, of the intestinal tract, the joint walls, indeed all organ systems. However, the substrate transport of flowing arterial blood to the cells and of the return transport of the residual substrate as well as the cell metabolic products back to the venous blood, i.e. the path of the extravasal substrate transport is determined by the mesenchyme cells, the fibroblasts. Collagenous proteins, proteoglycans (such as hyaluronic acid) and glycosaminoglycans determine the form and function of this interstitial matrix. Sympathetic and parasympathetic nerve fibres extend this far, and it is here that a multitude of immunological active cells sit: mast cells, B and T lymphocytes (Fig. 31) [8].

Disruptions to these vasa and extravasal transit paths play an important role in the pathogenesis and in the progression of organ diseases. "These microvascular changes may be central to the development of end-organ damage brought about by hypertension, including ischemic heart disease" [5].

The mesenchyme cells react to physiologically adequate stimuli such as heat, cold and neural stimuli by accelerating the metabolism and adapting the degradation (ubiquitin system) and synthesis performance. Via the endothelial-mediated tonus regulation, the increased NO

formation results in vasodilation. In this way, the distribution of the blood in the capillary network is adapted in line with the needs of the cells. We talk about a regulatory adaptation and non-specific mesenchyme reaction according to Hauss [8] (Fig. 32).

2. About the pathophysiology: Effect of a dysfunctional microcirculation on cells and intercellular space and pathogenesis.

Pathogenic noxae or (non-)physiological strains (stress, a poor diet, exogenous or even endogenous intestinal toxins, as well as ageing processes as such) result in increased NO accumulation and to dysregulation.

The mesenchyme cells react with increased replication and proliferation and boosted export of extra-cellular substances in the interstitial matrix. Hypoxia and acidosis of the muscles, fascia cause irritations to the nociceptors and pain (Fig. 33).

Endothelial dysfunctions and non-specific inflammation reactions are the result [9]. These so-called silent inflammations are responsible for many illnesses to the intermediary metabolism: arteriosclerosis, cardio-vascular illnesses, primary chronic rheumatic illnesses, autoimmune illnesses, organopathies and metabolic diseases. The formation of inflammation mediators such as prostaglandins, IGF1, interleukins and TNF alpha factors contribute towards the chronification of [8] (Fig. 34).

3. Effective physical therapy methods: Heat, red light, cold – how the physical vascular therapy works:

Active substance, place of action and effect – why do we need a therapy-rele-

vant Physical Vascular Therapy? Clinical results, study situation.

The Physical Vascular Therapy improves a deficient vasomotion rate of small and very small pre-capillary arteriolar vessels [4]. This results in an improved distribution of the blood in the capillary networks of the microcirculation system. The vicious circle of under-supply and tissue acidosis is interrupted.

That is why the "BEMER® Physical Vascular Therapy" is indicated for the prevention and adjuvant therapy of illnesses and symptoms which are caused by a disrupted microcirculation system, which occur at the same time or which cause complications as the result of dysfunctional microcirculation. Hence there arises an "intended use" for

- ▶ Degenerative disorders of the musculoskeletal apparatus,
- ▶ Metabolic disorders (e.g. diabetes mellitus, lipometabolism diseases),
- ▶ Polyneuropathy (as the result of diabetes mellitus),
- ▶ Peripheral arterial vascular diseases,
- ▶ Wound healing disorders,
- ▶ Chronic fatigue (e.g. patients with chronic stress or Multiple Sclerosis),
- ▶ Pain.

4. Practical application: Safe application. Basic application, application in the case of specific illnesses. FAQs. Are side-effects conceivable?

Individual treatment plans are worked out using frequent symptoms. A specifically thankful task is the synergetic application in the medical and therapeutic practice. How do methods such as neural therapy, acupuncture, (ozone) oxygen therapy or even drug infusion thera-

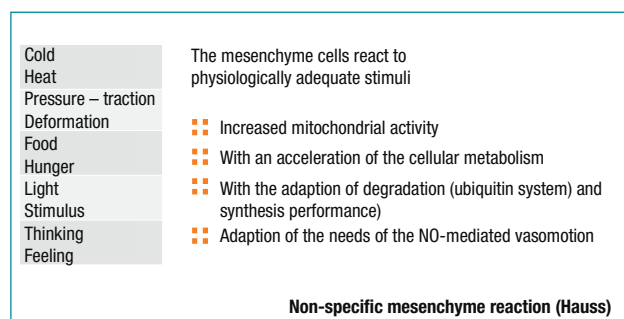


Fig. 32

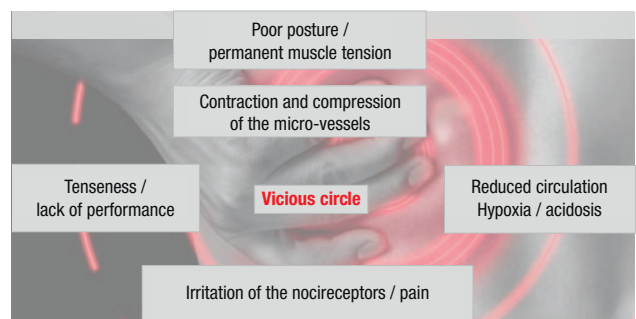


Fig. 33

Exogenous / intestinal toxins	■ Vasoconstriction (adrenergic system)
Lack of exercise	■ Restriction of the nutritive supply
Overstrain	■ Hypoxia
Poor diet	■ Restriction of the mitochondria function of the cells
	■ Increased attack of free radicals (nitronative stress)
Illnesses	■ Restricted vasomotion
Infections	■ Increased discharge of metabolites in the interstitial matrix
Chronic stress	
Excess stimuli	

Non-specific mesenchyme reaction III (Hauss)

Fig. 34



Fig. 35

- The frequency of the application depends on the individual opportunities of the patient and the intended effects
- Ideally: two full-body applications daily
- Even 2–3 applications per week have a therapeutic effect
- Double application B. Body + local applicators
- They depend on the therapeutic requirements

pies work together? **Dosage:** Drug therapies work primarily on the success organ and are partially associated with severe side-effects. Physical measures, on the other hand, develop their effect as a **secondary effect**, i.e. as a reaction of the auto-regulation system. Endogenous functions are not dominated (proteins are not blocked); instead, they are stimulated – in this case, in the effects and reactions in the mesenchymal space (see above).

This explains why the success of the therapy depends to a certain degree on the individual, morbid and constitutional situation of the patient and the strength of the stimulus of the therapy must be individually determined. “It’s not the strongest stimulus that is just about endurable that is the best – it is the weakest that achieves an adequately good effect” (Arndt Schmidt Rule). Used locally for acute injuries on primarily healthy patients, high intensities have proven their worth in therapy: in the systemic therapy of patients with chronic-inflammatory illnesses, **low-dosage therapy** has proven its worth! (Fig. 35)

5. Instructions for the economically feasible use in the practice.

The formation of **regional quality circles** enables individual, topic-centric further training and the presentation of cases. Working groups offer the perfect setting for the expert exchange of experience, including over and beyond the

experts’ own areas of speciality as well as ideas and safety in the practical use. The training as **consultant physician** serves the purpose of providing the better medical care of users. This intensive seminar trains the doctor to be a “specialist” for the application of the “BEMER® Physical Vascular Therapy”. Consultant physicians can then be summoned to care for the patient on site.

The latest research results on the “BEMER® Physical Vascular Therapy” and the consequences for its application and the therapeutic efficiency in the clinic and the practice are presented at **congresses and symposia**.

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Science Award – the winners between 2011 and 2015

2011 – Milestones in the Field of Medicine



Prof. Dr med. Rainer Kloppe received the Science Award for his many years' research work into microcirculation which has laid the scientific basis for the Physical Vascular Therapy.

This award is presented jointly by the Ärztesgesellschaft für Ernährungsheilkunde e. V., the Haug Verlag, the IPO – International Prevention Organization and, for the first time, the new International Microvascular Net, the IMIN.

2012 – Experimental and Clinical Research



Prof. Dr med. Blanka Řihová was honoured for her work on the influence of physical vascular therapy on the experimental T-cell lymphoma in mice.



Dr med. Joachim Piatkowski was honoured for his excellent observation study with patients using Physical Vascular Therapy.



Prof. Dr med. Tjalf Ziemssen was awarded the prize for his scientific study on the long-term treatment of MS fatigue using physical vascular therapy.

2013 – Comparative Clinical Trial amongst PAOD Patients



Dr med. Sandor Ivan Bernat proved in a double-blind, placebo-controlled comparative clinical trial the effectiveness of physical vascular therapy in PAOD patients.

2014 – Stimulation of the Microcirculation in Diabetes and Wound Healing Disorders



Dr med. Wolfgang Niemer and his team were awarded the Science Award for their work "Effects of a physical stimulation of the spontaneous arteriolar vasomotion on the microcirculation and immune system in diabetes and in wound healing disorders".

Further information available at:

www.imin-org.eu

www.bgv-physikalische-gefaesstherapie.de

2015 – Pilot Study on Pain and experimental Research



Prof Dr med. Tamas Bender was awarded the prize for his randomised, controlled, double-blind, clinical pilot study of 50 patients with arthrosis of the knee and chronic lower backache.



In their experimental work on human cells, Dr Katja Storch and Dr Ellen Dickreuter proved that BEMER Physical Therapy boosts the cytotoxic effect of radiation.

