

Treatment of osteoarthritis with Horizontal Therapy (HT)

What is Horizontal® Therapy?

Horizontal Therapy imitates the natural cell functions

Cells in living tissue use
electricity and chemistry
simultaneously at all events.

Electrical events are always
accompanied by biochemical events
and vice versa.

Bio-electrical events are used e.g. for

- membrane activity,
- muscle contractions and
- information transferred by nerves.

Bio-chemical events are used e.g. for

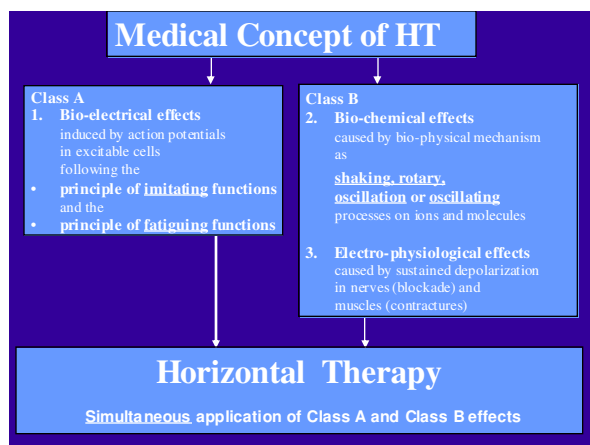
- metabolism,
- pain conditions and
- inflammatory processes.

Horizontal Therapy can create both simultaneously:

Bio-electrical effects
by action potentials

and

bio-chemical effects
by bio-physical mechanisms.



Bio-electrical effects

induced by action potentials in excitable cells following the

principle of imitating functions

and the

principle of fatiguing functions

The principle of imitating functions uses the normal range of the physiological discharge frequencies to stimulate nerves and/or muscles.

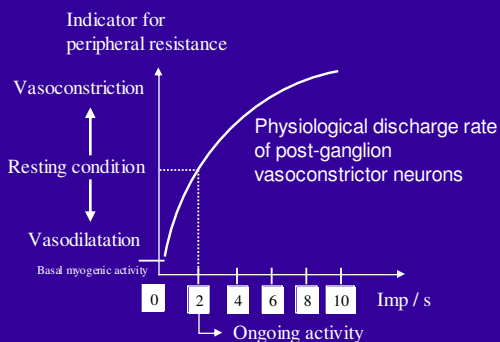
The principle of fatiguing functions uses higher stimulating frequencies above the normal discharge frequency range of the stimulated excitable cells.

The borderline frequencies between the imitation range and the fatiguing range are

for sympathetic nerve fibers 10 Hz,
for motor fibers 20 Hz and
for the majority of sensory nerve fibers about 100 Hz.

Influencing the blood circulation in an upper extremity is a good example to explain the two principles.

Influencing the blood circulation



BRBAUMER, N., & R. F. SCHMIDT: Biologische Psychologie
Berlin, Heidelberg, New York, Springer 1990, 1991

The result of the stimulation with 10 Hz is a vasoconstriction

according to the principle of imitating functions.

The result of the stimulation with 100 Hz is a vasodilatation

according to the principle of fatiguing functions.

Bio-electrical effects of HT

Therapeutic effects according to the principles of imitating functions and fatiguing functions.

Pain relief		
• Counterirritation effect/Gate control	50 – 150 Hz	
• Release of endorphins (Longer-lasting effect)	3 – 150 Hz	
Muscle stimulation		
Striated muscles		
• Endurance	1 – 4 Hz	
• Build-up	20 Hz	
• Relaxation	100 – 200 Hz	
Non-striated muscles		
• Activation	1 – 4 Hz	
• Spasmolysis	100 – 200 Hz	
Influencing blood supply and lymph transport		
• Vasoconstriction	10 Hz	
• Vasodilatation	100-200 Hz	
Acceleration of reinnervation	10 Hz	
Edema reduction	10 Hz	
Influencing metabolism		
• Stimulation	all frequencies	
• Activation	all frequencies	
Activation of lipolysis	3 Hz/ 1 – 10 Hz	

Medical Concept of HT

Class A

1. Bio-electrical effects induced by action potentials in excitable cells following the
 - principle of imitating functions and the
 - principle of fatiguing functions

Class B

2. Bio-chemical effects caused by bio-physical mechanism as shaking, rotary, oscillation or oscillating processes on ions and molecules
3. Electro-physiological effects caused by sustained depolarization in nerves (blockade) and muscles (contractures)

Horizontal Therapy

Simultaneous application of Class A and Class B effects

Bio-chemical effects

are caused by bio-physical mechanisms as

- shaking,
- rotary and
- oscillation processes



Simplified HT signal

on ions and molecules.

The shaking effect



Research has proven that an area of pain and inflammation has a high concentration of pain and inflammation mediators.

This concentration of pain mediators is necessary for pain signals to be generated in the CNS.

One example of a pain mediator is a positively charged Hydrogen ion (H^+).

With Horizontal Therapy we apply two electrodes to create an alternating electrical field of a few thousand waves per second in the area of pain.

The electrical force of the alternating field shakes and moves the H^+ ions forward and backwards.

By this we get a distribution and dilution of the ions followed by a reduction of the concentration of pain mediators.

This provides us with longer lasting pain relief because it takes time for concentration levels of pain mediators to build up again.

The shaking effect



equilibrates the differences in concentration.

As a result of these physical mechanisms we found peripheral pain relief and anti inflammatory effects in all cases of chronic inflammations and acute non infectious inflammations and edema reduction as well.

The shaking effect

causes
a distribution
of
methyl blue
ions in
petri dishes

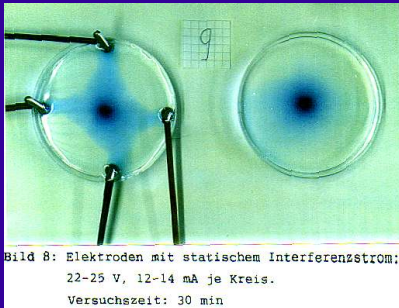


Bild 8: Elektroden mit statischem Interferenzstrom:
22-25 V, 12-14 mA je Kreis.
Versuchszeit: 30 min

Ehmen G.: Diffusionsbeeinflussung im Knochengewebe durch
Interferenzstromverfahren, Fachhochschule Wilhelmshaven 1990

The shaking effect

accelerates the diffusion processes

- important for osteoarthritis treatments -
and

increases the probability of encounters
between enzymes and substrates.

This mechanism supports the metabolism.

Metabolism

Schematic representation of the hypothesis of orbital orientation saying that the substrate and the catalytic group of the enzyme not only have to be in neighboring positions, but they also have to have the correct orientation so as to allow the respective orbital to overlap as much as possible.

According to A. Dafforn and D. E. Koshland Jr., Biochem. Biophys. Res. Commun. 52, 780 (1973)



Unfavorable orientation / position



Favorable position, unfavorable orientation



Favorable position / orientation

The rotary effect



upon water molecules - as dipoles – and other molecules with asymmetrically distributed elementary charges destabilized the hydration clouds (clusters) of ions including substrates and enzymes.

The rotary effect increases thereby the property of the water as a solvent.

The result is a facilitation of the metabolic processes.

The oscillation effect



upon not freely movable structures means, that oppositely charged different parts of the molecules move simultaneously in opposite direction.

The oscillation effect increases the movements of fluids (water and in water dissolved or immersed substances) between the oscillating structures.

The oscillation of not freely movable structures has the following therapeutic effects:

- Tissue cleansing,
- facilitation of the metabolism,
- pain relief and
- edema reduction.

The oscillation deforming effect

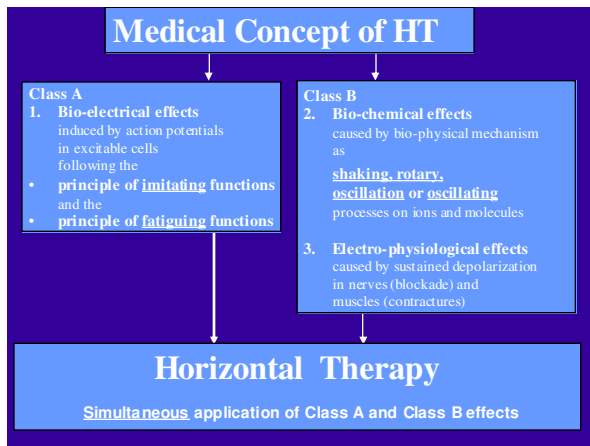


generates conformation changes of macromolecules including signal molecules.

This activates special enzymes.

We can expect –
for instance in the cell membrane –
the activation of the adenylate cyclases
followed by a formation of the
second messenger cAMP
(cyclic adenosine monophosphate).

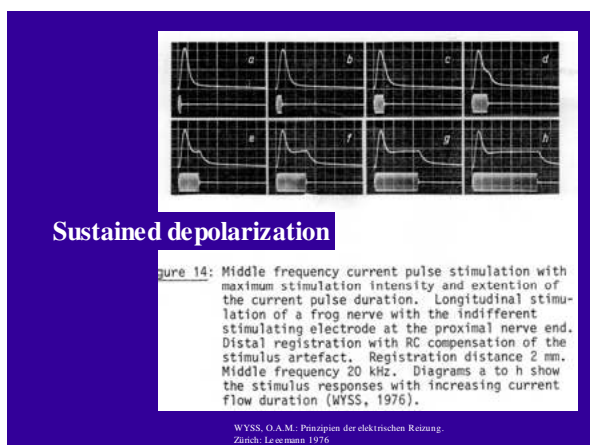
The oscillation deforming effect thereby
imitates Hormones due to changes of
membrane conformation.



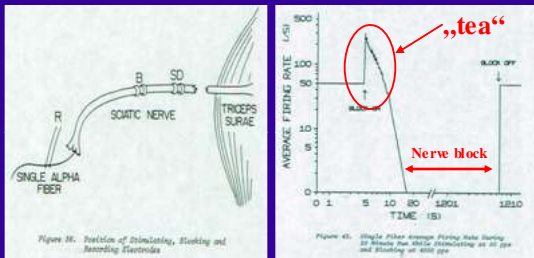
Electro-physiological effects caused by sustained depolarization

With Horizontal Therapy we have the possibility of creating a nerve blockade due to a sustained depolarisation of the cell membrane.

Over the course of several treatments the tissue actually “learns” to normalize concentrations of pain mediators on its own. We call it the “PHD” or Post Hyperactivity Depression effect.



Nerve block induced by sustained depolarization



BOWMAN B. R., : Electrical Block of peripheral motor activity, Ljubljana and Rancho Los Amigos Hospital, Downey, California 1981

The sustained depolarization causes not only nerve blocks but also physiological contractures of striated and smooth muscles.

The sustained depolarization generates energy saving skeletal muscle contractions (direct muscle stimulation).

The contractures of smooth muscles of blood vessels and of lymphatic vessels reduce the intra vascular space and filtration pressure in the capillaries. The result is a reduction of local swellings (edema reduction).

“TEA”: Transient Excitatory Activity

TEA is a very intensive counter irritation, which leads to central pain relief.

Normally when you switch on the nerve block the cells will respond to the waves initially with several hundred action potentials per second, depending on the intensity. This lasts only a few seconds.

We call this a natural answer of the nerve.

The question is, how can we use this TEA effect for pain management?

Horizontal Therapy creates the best counter irritation effects that you can imagine. The counter irritation normally forced to stimulate the nerve with 100 Hz – 200 Hz. The nerves have to follow this stimulation frequency simultaneously to answer.

With the TEA effect the cell can do what it naturally does, sending out its “normal” frequency. TEA is created by the SCAN technology. When this feature is applied we automatically get the TEA effect.

Bio-chemical effects of HT

Therapeutic effects according to the

- “shaking”,
- “rotary”,
- “oscillating”

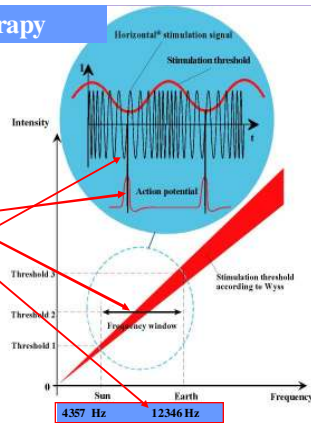
and the sustained depolarization mechanisms.

- Pain relief
 - Distribution of pain mediators (Longer-lasting effect)
 - Pain fibre blockade
- Direct muscle stimulation
- Anti-inflammatory effect
- Influencing blood supply and lymph transport
 - Vasoconstriction
 - Vasodilation
- Edema reduction
- Metabolic relief
- Activation of regeneration
- Wound healing
- Accelerated bone healing

How can we achieve
the two groups of effects
simultaneously
by
Horizontal Therapy?

Horizontal® Therapy

The frequency is modulated in a low frequency rhythm between 4357 Hz and 12346 Hz, which creates bioelectrical effects, with a constant amplitude, which creates biochemical effects.



Osteoarthritis

K. STEINBRÜCK, 1998 has given a lecture in Stuttgart at a sports medical symposium with the following statement:

“A key cause of osteoarthritis is the gradual development of an imbalance in the chondrocytic production of enzymes which build up the molecular matrix of the joint and those which reduce that matrix.”

The electrical alternating field (some thousand waves per second) created by Horizontal Therapy, increases the probability that enzymes and their substrates will meet while also increasing the chance that they will bind at the enzymes' optimal active “docking” sites.

These effects, which support metabolism, mainly happen intracellularly in the chondrocytes and in cells involved in the inflammation process, have regenerative functions as well.

In the Synovia and in the highly hydrated matrix of the cartilage tissue, the electrical forces of the alternating field are effective by balancing concentrations, just as organic and inorganic ions are exposed directly to the electric forces of the alternating electric field and move forward and backwards.

This beneficial diffusion effect of Horizontal Therapy is particularly important to osteoarthritis patients where pains lead to protection and a reduction of pain mediator spreading effects.

An additional pain fiber blocking effect can be seen on higher intensities with Horizontal Therapy. By this, peripheral osteoarthritis pain is soothed considerably or even removed.

Therefore, after Horizontal Therapy treatment, patients can experience an improved joint angle, which means an improved mixture of the Synovia and consequently, results in a better nutrient supply to the joint cartilage.

Another favorable effect is achieved by the Horizontal Therapy's positive influence on the circulation and the lymph transport.

By the electric physiological effects of the electrical alternating current of Horizontal Therapy, tonicity of both the skeletal musculature and the smooth vessel musculature is increased.

This leads initially to a reduction of the influx by the arterioles into the capillary net and to a tonicity of the veins and lymph vessels. Through this the intravascular volume is reduced in inflamed areas, which, in the case of the knee joint, are in the periarticular tissues.

The metabolism of the endothelium and all cells located in the treatment area is activated by a membrane effect of the electrical alternating fields.

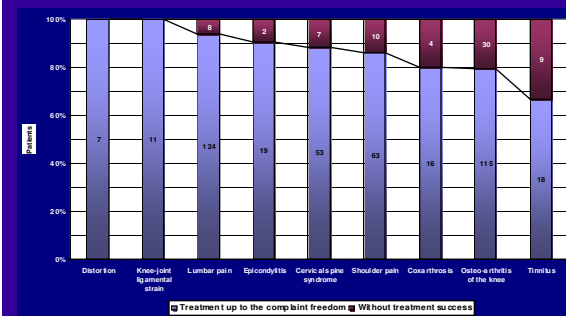
In the literature, significant changes of the cAMP mirror under the influence of middle frequency electrical alternating fields have been described (Brighton & Townsend, 1986; Noszvainagy et al, 1992.).

Horizontal Therapy promotes the metabolism, circulation, lymph transport, and the diffusion processes in the treated area. The function of the chondrocytes is improved by Horizontal Therapy as is the production of the hyaluronic acid support.

Therefore many patients report that their knee feels like it just had an oil change.

Clinical studies and case studies :

In Germany, a study on 496 patients was conducted by Dr. Klotzbücher between October 99 and May 02. He reported 80 - 90% success rate after 6 to 10 treatments.



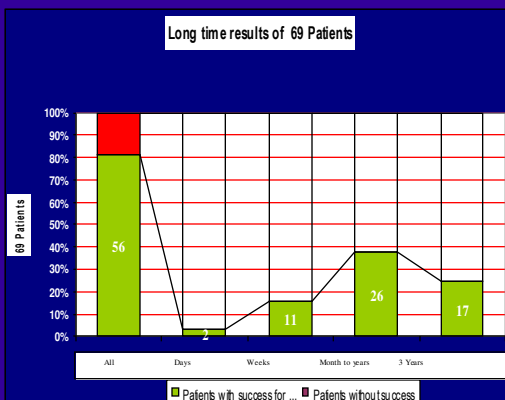
Three years after their treatments ended, the 100 patients who reported the most pain at the beginning of Dr. Klotzbücher's study were questioned once again.

The question was:

"How many weeks, months or years after the Horizontal Therapy treatment did the patients remain symptom free?"

69 of the 100 patients answered.

Long time results of 69 Patients



20% experienced a return of symptoms shortly after the therapy ended.

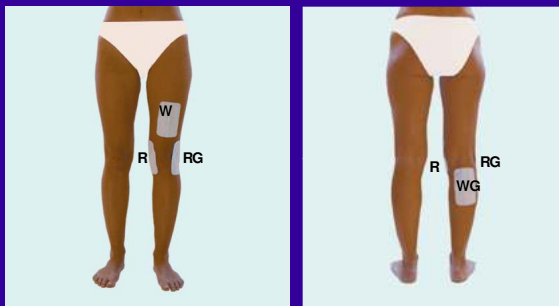
80% or a total of 56 patients, reported continued pain free activity. Of these 56 patients 43 reported they were symptom free from 6 months up to three years after the initial treatments ended, with no maintenance treatments administered in between.

Typical results are better than those shown here because, remember, these results were for the most difficult cases who reported the highest pain levels pre-treatment.

Whole Body treatment



Knee treatment



Osteoarthritis multi center study,

R. Saggini, R. Carriel, Universities Chieti and Catania, Italy 2004

Pain reduction by HT

VAS	Number of patients									
	Follow-up									
	Initial	End of treatment		1 month	3 months	6 months	12 months			
0 - 2	0	0 %	108	54 %				8	5 %	
3 - 5	20	10 %	92	46 %				130	76 %	
6 - 8	142	71 %	0	0 %				22	13 %	
>8	38	19 %	0	0 %				10	6 %	
10	0	0 %	0	0 %				0	0 %	
Total	200		200					170		

Before treatment 180 of the 200 patients reported a VAS pain level of 6 to 9 out of 10.

This represents 90% of the patients studied.

After ten treatments 100% of the patients were in the pain level of 0 to 5.

46% of those studied were in the range of 3 to 5. 54% were in the range of 0 to 2 and there were no patients in the 6 to 9 range where before treatment 90% of the patients were self classified.

Before treatment all 200 patients took drugs. 60% of the patients, or a total of 116 took their medication twice a day. The rest took pain medications just once per day.

After 10 treatments all 200 patients were able to completely eliminate pain medications.

Drugs	Number of patients					
	Follow-up					
	Dosis/day	Drugs used before HT	Drugs used after HT	3 months	6 months	12 months
Nimesulide	2	64	0	20	34	46
Piroxicam	2	52	0	26	18	33
Ketoprofen	1	30	0	21	29	26
Diclofenac	1	40	0	18	27	34
Salicylates	1	14	0	2	6	12
Total		200	0	87	114	151

Horizontal Therapy offers 7 different features in pain management:

1. Counter irritation / Gate control theory
2. Release of endorphins in the CNS – longer lasting pain relief
3. Distribution of pain mediators - longer lasting pain relief

4. Pain fibre block - longer lasting pain relief due to the “phd” - post hyperactivity depression - effect
5. “tea”: transient excitatory activity, a very intensive counter irritation, which leads to central pain relief. “tea” is created by the so called SCAN Technology.
6. Reduction of pain causing factors - longer lasting pain relief
7. Acupuncture whole body pre-treatment

Contra-indications

Patients with implanted pace-makers or other implanted electronic units may not be treated.

The uterus of a pregnant women should not be included in the treatment area.

Patients with acute feverish general infections may not be treated.

Area with acute local bacterial infections should not be treated.

I thank you for your attention
and your patience.
