Title: Neurotango® is a holistic (neuro-, physio-, psycho and socially oriented) concept with supportive tools for neuromotor functions

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Abstract: Introduction: Objective: the research focuses on the development of practical, mostly physical and neuro-motor exercises, tools with the target to access and influence brain functions and to create new connections within the brain with the goal to improve motor, psychological and social abilities. Neurotango® tries to bridge the gap between research and the physical development of practical and functional exercises.

Methods: the Neurotango® concept is divided in three parts.
1) the 13 tango tools (exercises based on techniques taken from the Argentine tango]
2) the psycho tools (exercises and techniques for psychological target groups]
3) the neuro tools (pre-exercises for target groups with neurologic diseases to boost the brain functions and enable them to exercise the 13 tools in point 1)

Results: since 2013, we (about 100 certified Neurotango® practitioner, under them neurologists, psychologists, occupational therapists, and coaches] are observing an extreme improvement on all levels [neuro-, physio-, psycho and social orientated].

Discussion: Further research should focus on longitudinal neuroimaging studies to see whether Neurotango® has a significant impact on the neuroplasticity and brain areas of the improved functions.

Neurotango®

Introduction

The Neurotango® concept was developed as a problem focused concept for different target groups on a holistic level. Holistic in this case means, it focuses on neurological, physiological, psychological and social factors to improve the targets life. The process of Neurotango® operates with a simplified work method based on simplest argentine tango techniques (applicable without prior knowledge of tango and/or music). It is effectively focused on individual targets (scalable on a specific problem), universally applicable to all above mentioned targets and offering expandable possibilities for different therapy and problem areas.

The achievement of the "universal applicability" in case of neurologic (Parkinson´s disease, Multiple Sclerosis, early stages of dementia) and psychological targets (e.g. Autism spectrum disorder, Borderline, Psychooncology) groups under consideration of the special cognitive, psychological, and physical limitations, can only be realized by the expanded methods of #NT-#NeuroTools and #NT-PsychoTools. The method of using the #NeurotangoTools had to be expanded with the #NT-NeuroTools and the #NT-PsychoTools due to the requirements for feasibility. They can be understood as pre-exercises as well as supportive Tools. Both have a training focus on the special handicap of these groups as basis to work with the #NeurotangoTools.

The observed results are a summary of the concept application from 2014 to 2020 by Neurotango® Practitioner (certified tango therapy training for therapists, medical professionals, psychologists, and coaches). About 100 Neurotango® Practitioner are working with the concept all over Europe at the moment.

Lots of research has focused on dance therapy as an additional tool for improving well-being as well as for rehabilitation and to slow down the course of neurodegenerative diseases [1,2,3].

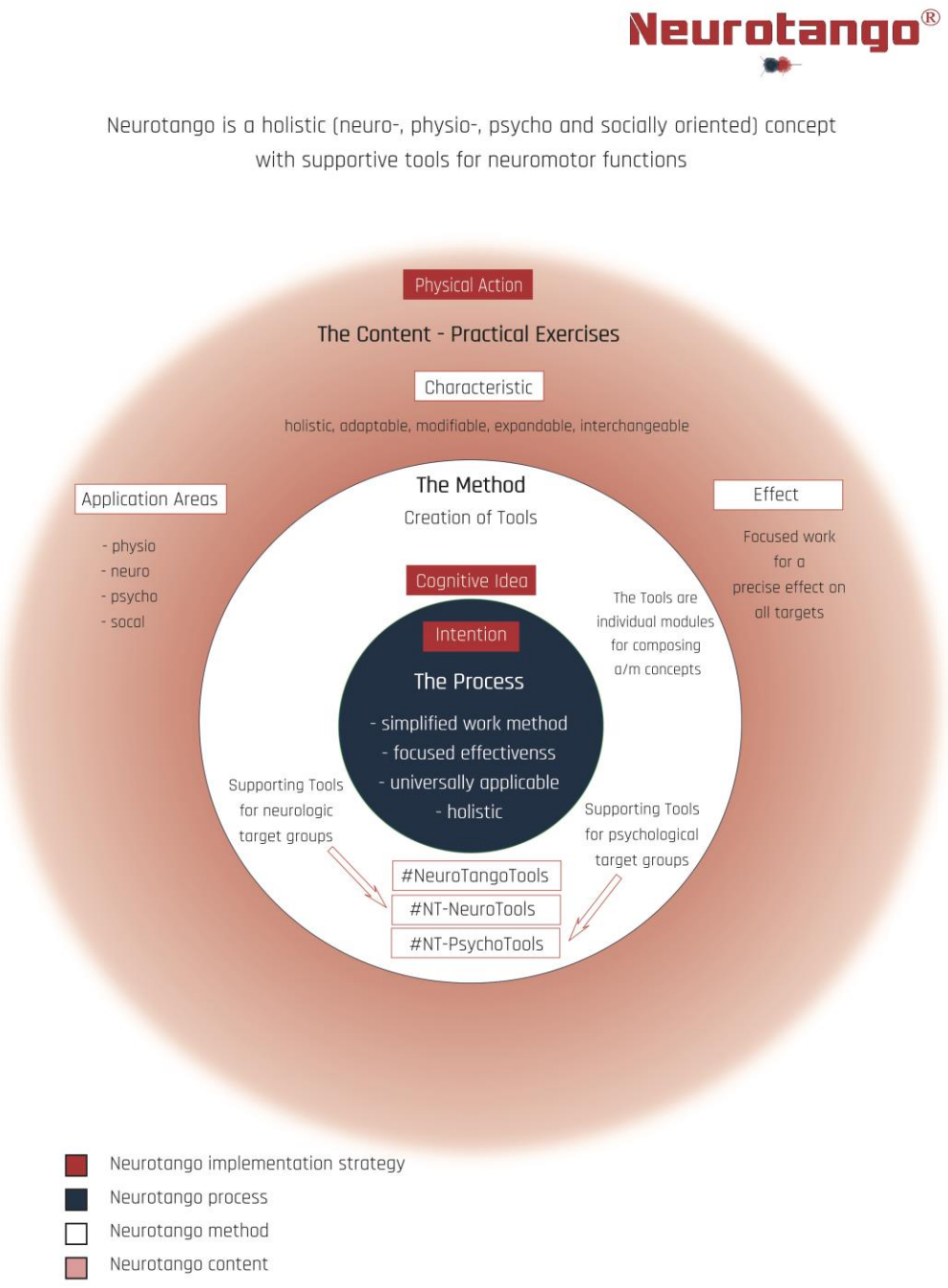
For the goal of a “focused effectiveness”, the NeurotangoTools are all based on scientific studies and knowledge taken from neurological research with special focus on neuroplasticity, mental an emotional stimulation for learning, kinesiology, and aging research.

Various studies have shown the positive effects of tango therapy and dance on well-being, for example Lötzke, Ostermann & Büssing (2015) found that patients showed a higher overall quality of live [4]. Quiroga, Kreutz, Clift & Bongard (2016) support this assumption [5]. But it seems like tango therapy not only works on a psychological level, but also on the neurological.

Brown (2008) showed that during tango, different brain regions are connected, which would help to improve overall functioning [6]. It can be assumed that tango therapy stimulates both hemispheres of the brain during all exercises, because in Tango extremities of both body halves are used at the same time *(“tango disociación” or “contra body movement”)*. In addition, many areas of the brain are used at the same time, as the training involves complex and simoultaneous tasks such as spatial orientation, musicality, counting beats, attentiveness and reflection of the partner, coordination, balance, counter-synchronous movements of legs and arms, changing speed and reaction time, non-verbal communication, expressing feelings through movement, etc.

Another study also shows that the symmetry of both brain hemispheres decreases with age [7]. The more symmetrically the brain of the participants still functioned, the better the cognitive results. In Tango Therapy, both hemispheres of the brain are specifically trained to work together. The more symmetrical use of the two hemispheres of the brain is particularly beneficial for the improved abilities of the frontal lobe, which in older people takes over the bridging use of the lost capacities of other parts of the brain [7]. But not only brain activation, but neurobiological changes within tango dance can be seen. Decreased cortisol concentrations were found in participants who danced to music and increased testosterone levels when participants danced with a partner. Dancing with a partner to music led to a positive emotional

state [8]. This recent literature, as well as the observed changes by applying the Neurotango® concept could be an indication for neurological improvements with neuromotor and holistic effects.



Method:

NeurotangoTools(overview):

The number of NeurotangoTools vary in different publications [9] and were mentioned as “Tango Tools” in earlier publications. The different quantity of the tools is due to the character of the concept that is open for expanding. The renaming from Tango Tools to #NeurotangoTools #NT-Psychotools #NT-Neurotools was made for better distinction to other tango therapy concepts. The application areas are physiological, neurological, psychological, and social. Their characteristic is holistic, easily applicable, adaptable, modifiable, and expandable. Exercises are interchangeable, depending on the target group or treated problematic. This provides the basis for a focused work for a precise effect on all mentioned targets.

#NeurotangoTools:

#NeurotangoTool1: Straight Lines, #NeurotangoTool2: Walking and Standing in a 2-Axis System (Weight change from side to side), #NeurotangoTool3: Leading and Following, #NeurotangoTool4: Dynamics, #NeurotangoTool5: *Arrepentida* – Taking a Step Back, #NeurotangoTool6: Foot and Body Coordination, #NeurotangoTool7: La disociacón - Contra Body Movements, #NeurotangoTool8: Dancing with movement and posture supporting equipment, #NeurotangoTool9: Waltz Step for inner balance, #NeurotangoTool10: La Milonga Baldosa (combination of weight change, dynamic 2/4, breaks and straight lines), NeurotangoTool11: La Milonga Traspié (diagonal and sidestep movement), NeurotangoTool12: El Rulo – Leg Rotation and Pelvis Energy, #NeurotangoTool13: The Syncope (fast reaction improvement), #NeurotangoTool14: Breathing into the movement, #NeurotangoTool15: Canyengue (movement accentuation).

(The 15 #NeurotangoTools are the latest and expanded version. The abstract and other literature only mentions 13 as above mentioned.)

#NT-NeuroTools:

The deficits in neuromotor functions and cognitive abilities caused numerous problems for the execution of the #NeuroTangoTools. Depending on the symptoms, only about 20% (estimated value) were able to execute the #NeurotangoTools with desired effect of the tool targets. The introduction of the #NT-NeuroTools reached about 95% of the participants to put the #NeurotangoTools effectively into practice.

The #NT-NeuroTools consist of 3 pre-exercises for the #NeurotangoTools. The first exercise is for neuromotor stimulation, mental concentration, and awareness. It consists of components for motor action and cognitive memorizing performance. The second exercise is a combination of music (as an emotional stimulus), counting as rational brain stimulation and a multitasking exercise of different movements with feet and hands (feet tap the beats and hands conduct the melody). The exercise is taken from the movements and cognitive work of counting the beats of an orchestra conductor. It was found that the progression of Alzheimer´s disease seem to be completely diminished (no case was found) in this professional group and suggested to imitate the effect of their activity [10]. The third exercise is basically taken from kinesiology. Movements are executed crosswise to stimulate both brain parts at the same time. By rhythmically striking on different body parts in combination with music, a harmonious rhythm of blood pressure, brain waves, heartbeat as well as a relaxation of the muscles seem to be the result.

#NT-PsychoTools:

Additional tools were fundamental to create better circumstances for the lack of motivation, limited possibilities of connection and interaction, depressive episodes, disbalanced stages, fears, and anxieties in psychological target groups. The #NT-PsychoTools are more ludic exercises to allow distance and liberty to avoid mental pressure by the application of

#NeurotangoTools. Modified body contact avoiding (e.g. long wood sticks or sitting balls as contact transfer media) and versions of tool number three ‘leading and following can be used without confronting eye or closer body contact. Other exercises like ‘ask for a dance” are useful to prepare the participants to enter a communicational level that makes it possible to work with Neurotango® tools. The positive experience to be accepted in a dance seems to increase self-esteem. The dance partners are asked in a playful, performing way (serious, funny, promiscuous, drunken etc.) to get a more realistic evaluation of their self-image. These participants need to feel comfortable within the surrounding, other people and themselves before they are able to make improvements. Nevertheless, the #NT-PsychoTools were already significant for the first improvements like overcoming physical contact and cognitive reaction problems because e.g. fears, anxiety and communicational disability are part of the problems or symptoms.

Results:

Based on observations during and after participation in Neurotango® classes, following observations can be mentioned. It should be mentioned that some of the observations cannot be clearly separated in different areas. They have holistic effects on for example neuromotor functions.

Neurological stimulation and improvements:

memory improvement, increased attention and focus, planning correct order of actions, activation of the auditory cortex for faster reaction on external stimuli, faster decision-making, faster sense perception processing, mental flexibility, precognitive abilities, spatial perception, brain connectivity.

Physical (also cardiovascular and biochemical) improvements:

multi-tasking, coordination, vitality, strength of muscles/bones/joints, fluent movement, improvement of gait pattern, balance, erect body posture, postural stability, relaxation ability, better blood circulation, pain reduction, more energetic and stronger body, physical endurance, improvement of bodily reflexes, learn breathing into the movement for better oxygen supply of muscles and inner organs, contra body movement for body flexibility, accuracy of moving (fine tuning), change of dynamics, symmetry awareness

Psychological improvements:

feeling of lightness, relaxation, emotional balance, self-confidence, self-esteem, motivation, empathy, mental energy, relational skills, stress-free, anxiety-free, diminution of compulsive actions, self-awareness, awareness of others, appropriate reaction on closeness-distance situations, social skills, expression of feelings, consideration of own needs and needs of others for decisions, appreciation, less aggressivity, patience, trust, sharing, team spirit, leading and following, set limits for distance and closeness

Social improvements:

more creative and increased interest, more outdoor activities, stronger exchange within social relationships, travelling, new occupations, higher independence by using a car or public transport, positive attitude, better sleep, social skills, more successful, more popular

Results of #NT-NeuroTools:

The additional use of #NT-NeuroTools enables participants with neurodegenerative diseases (Morbus Parkinson, Multiple Sclerosis, early stages of dementia) as well as patients with other neurological problems like rehabilitation of stroke patients, to be pre-conditioned to train the #NeurotangoTools and to realize the following improvements:

an awake state, fluent speech, better coordination, higher cognitive capacity of understanding

and processing, faster bodily reactions, fluent neuromotor transfer of impulses for movements.

Results of #NT-PsychoTools:

The observed improved preconditions on the psychological level are e.g. allowing of physical contact, fearless connection to training partners, less anxious to fail, realistic estimations of obstacles, trust own bodily possibilities, better cognitive reactions, opening to communication and interaction, ensure psychological balance and stability.

Results for both (#NT-PsychoTools and# NT-NeuroTools):

In both target groups could be observed that participants with apathetic conditions changed into a normal state including movements and communication in dialogues.

The inner and outer complexity of Tango Therapy shows that especially these two target groups, although Neurotango® is a minimized concept on the technical basics of argentine tango, it necessarily has to be prepared with additional methods to reach a successful target.

Discussion:

Because of the observed positive effects and easy application of the Neurotango® concept, it is practically applied in most diverse therapy or coaching areas as stand-alone therapy concept or part of other therapy forms (like e.g. cognitive behaviour therapy, physiotherapy exercises). However, all results are on an observational level. To date, no randomized controlled trial has been conducted, which could be the first step in future research. A neurobiological investigation and neuroimaging methods focusing on neurological effects and duration would be required to provide proved statements.

Few research has focused on tango therapy over the past years, even though it seems to be an effective approach to increase people's well-being [11]. Quiroga (2009) found that music and

dancing with a partner leads to a significant positive affect in people and decrease in cortisol levels. This supports our assumption of increasing people´s well-being through Neurotango®. Especially in people with neurodegenerative diseases such as Parkinson´s disease, Tango therapy is a promising tool to improve gait pattern [12]. We further observed that after discontinuation, the effects of Neurotango® therapy disappeared, which can be supported by an fmri joggling study, in which the brain alterations changed after not continuing with juggling [13]. Conducting a longitudinal study would therefore be beneficial.

References

[1] Dreu Miek J, van der Wilk ASD, Poppe E, Kwakkel G, van Wegen EEH. Rehabilitation, exercise therapy and music in patients with Parkinson's disease: a meta-analysis of the effects of music-based movement therapy on walking ability, balance and quality of life.” Parkinsonism & related disorders. 2012;18:114-119.

[2] Xia J, Grant TJ. Dance therapy for schizophrenia. Cochrane Database of Systematic Reviews. 2009; 1:1465-1858.

[3] Barton EJ. Movement and Mindfulness: A formative Evaluation of a Dance/Movement and Yoga Therapy Program with Participants Experiencing Severe Mental Illness. Am J Dance Ther.2011;33:157-181.

[4] Lötzke D, Ostermann T, Büssing A. Argentine tango in Parkinson disease-a systematic review and meta-analysis. BMC Neurol. 2015; 15:226.

[5] Quiroga Murcia C, Kreutz G, Clift S & Bongard S. Shall we dance? An exploration of the perceived benefits of dancing on well-being. Arts & Health.2010;2:149-163.

[6] Brown S, Martinez MJ, Parsons LM. The neural basis of human dance. Cereb Cortex. 2006; 16:1157-1167.

[7] Davis S, Dennis NA, Daselaar SM, Fleck MS, Cabeza R. Qué PASA? The Posterior-Anterior Shift in Aging. Cereb Cortex. 2008; 8:1201-1209.

[8] Quiroga C, Bongard S, & Kreutz G. Emotional and Neurohumoral Responses to Dancing Tango Argentino: The Effects of Music and Partner. 2009.

[9] Bayreuther K. Alzheimer wird uns immer begleiten. Gehirn und Geist. 2012; 5: 66-70.

[10] Schlafhorst S. Neurotango® - Prinzipien der Tangotherapie. Neo Publishing. 2018.

[11] Hawkes L. The Tango of Therapy: A Dancing Group. Transactional Analysis Journal. 2003; 33:288-301.

[12] Koh Y, Kim IC, Noh G. Tango Therapy: Current status and the next perspective. J of Clin Rev Case Rep. 2018; 3:1-5.

[13] Boyke J, Driemeyer J, Gaser C, Büchel C, May A. Training-Induced Brain Structure Changes in the Elderly. J of Neuroscience. 2008;28: 7031-7035.

[14] Schlafhorst-Biermann S. - The perfect Therapy – All about Tango Therapy. 2024.

[15] Storch M, Cantieni B, Hüther G, Tschacher W, Embodiment. 2022.

[16] Erickson KL et al: Exercise training increases size of hippocampus and improves memory. Proc Natl Acad Sci USA 2011, 108:3017-3022, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3041121/

[17] Beerenbrock, Y., Meyer, L., Böhme, J., Herrlich, S., Mews, S., Berger, B., Martin, D., & Büssing, A. (2020). Perceived effects of Tango Argentino on body experience in persons with Parkinson's disease (PD)-A qualitative study with affected persons and their partners. Complementary therapies in medicine, 48, 102221. https://doi.org/10.1016/j.ctim.2019.102221

[18] Constantini et al. (2020). Trossero tango therapy and psychological distress in female cancer patients: An Italian pilot study. In: Clinical and medical Investigations 20 /Volume 5

[19] Hackney, M. E., Kantorovich, S. Earhart, G. (2007). A Study on the Effects of Argentine Tango as a Form of Partnered dance for those with Parkinson Disease and the Healthy Elderly. American Journal of Dance Therapy 29.

[20] Hackney, Madeleine & Earhart, Gammon. (2010). Effects of Dance on Gait and Balance in Parkinson`s Disease: A Comparison of Partnered and Nonpartnered Dance Movement. *Neurorehabilitation and Neural Repair 61 (6)*, 475-481

Neurotango®

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