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Alexander Technique and Focal Dystonia

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Dystonia is a group of disorders characterised by involuntary muscle contractions or cramps, leading to abnormal postures and/or movements (Jinnah 2015, p.1). For the affected person it is often perceived as a sudden loss of control over certain specific movements.

Dystonia is the third most common neurological movement disorder after tremor and Parkinson's disease and ten times more common among musicians than the broader population. Around one percent of musicians are reported to be affected by dystonia (Altenmüller et al. 2015, p. 95). Most Alexander Technique teachers attending my presentation had experienced working with musicians with various focal dystonias.

Until recently, being diagnosed with dystonia meant the end of a music career, but today there is a growing community of doctors, patients and therapists contributing to a better understanding of the condition (for example: IAB, the Interdisciplinary Working Group for movement disorders, and IMMM, the Institute of Music Physiology and Musician's Medicine, in Hannover). Often drugs are prescribed to aid recovery, however in dealing with my own dystonia I chose to avoid pharmaceuticals and persevere with Alexander Technique and meditation, and I would like to share what I learned in the process.

I will address:

1. Types of dystonia.
2. How the illness develops and what it feels like.
3. The physiological basis of dystonia.
4. Practical considerations for working with someone affected by focal dystonia.

1. Types of dystonia

In Table 1 you find an overview of the different types of dystonia (dystonia.org.uk).

Perhaps the most important consideration is that the earlier the onset of dystonia the higher the likelihood of different parts of the body being affected, adding complication. However, a later onset is no guarantee that dystonia will be confined to only one part of the body. That's one of the reasons why it is crucial to find a constructive way to deal with dystonia as early as possible.

Table 1: Types of dystonia

	Generalized dystonia	**Focal dystonia**	**Multifocal dystonia**	**Segmental dystonia**
parts of body affected	high likelihood for symptoms to progress from one to more parts	mostly one part	unrelated parts	adjacent parts
time of onset	early	adult		
causes	underlying genetic mutations highly probable	exact causes still unknown		

Types of focal dystonia:

- Cervical dystonia (torticollis): loss of head movement control.
- Blepherospasm: affects the muscles that control eye blink, leads to functional blindness and is usually treated successfully with botulinum toxin injections.
- Cranial dystonia (Meige syndrome): leads to twists and distortions of the face.
- Oromandibular dystonia (embouchure dystonia): affects the muscles controlling the lips and tongue and is common among wind players.
- Spasmodic dystonia: muscles which control the vocal cords are affected; the voice sounds hoarse or strangled, depending on whether the adductors or abductors are affected.
- Focal hand dystonias (task specific dystonias): come in many variations: writers cramp and the various musician's dystonias fall into this group.

Among musicians, guitar players, pianists and brass instrument players have the highest risk of developing dystonia (Altenmüller et al. 2015, p. 95).

2. How dystonia develops – 'Second hit' hypothesis

The affected person usually experiences a sudden onset of dystonia, however Altenmüller et al. (2015) showed that there is in fact a timeline in the development of symptoms of increasing severity. This is important because it allows for preventive measures. See also figure 1.

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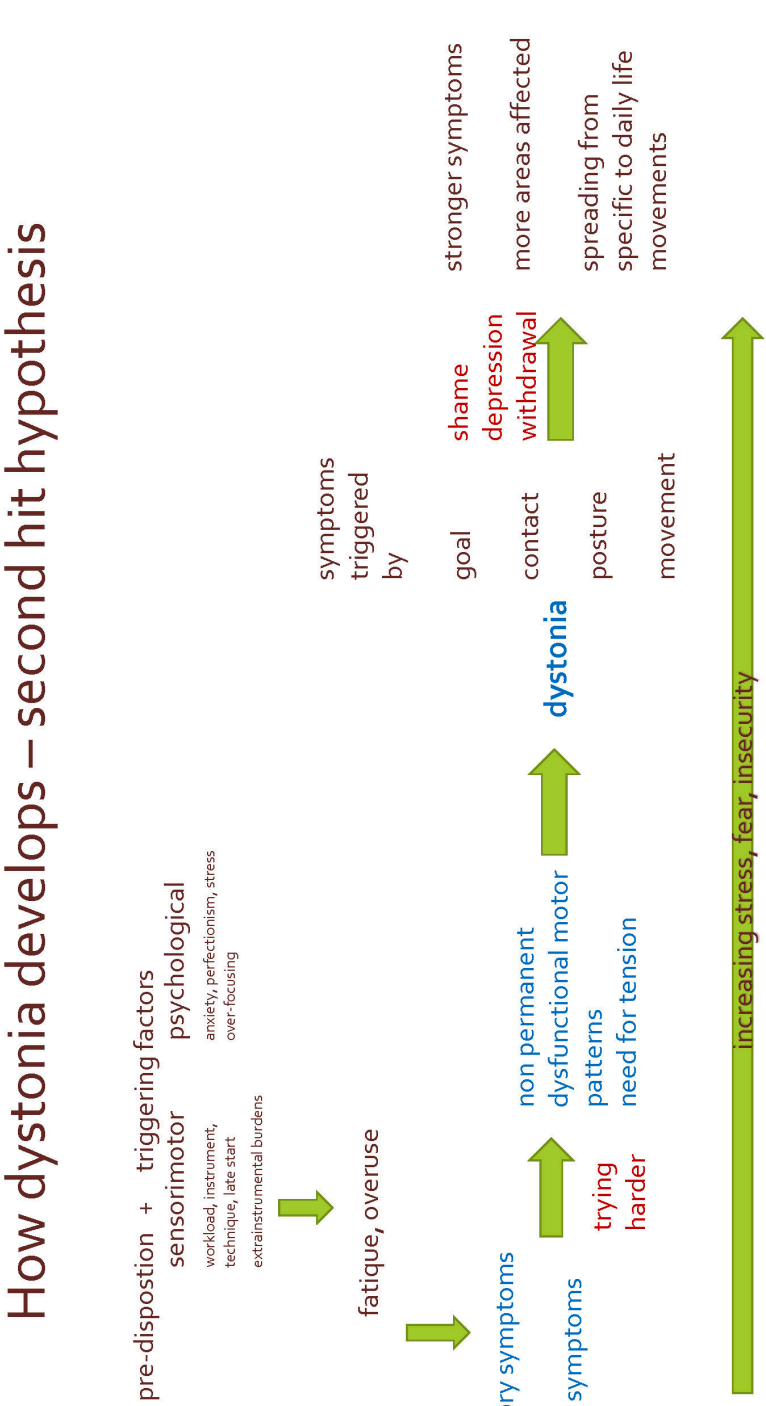

Fig. 1

According to Rauschenberger et al. (2021), scientists today give preference to the gene-environment hypothesis, or second hit hypothesis, stating that there is an underlying genetic pre-disposition which will only lead to symptomatic expression if triggered. In other words, people can have the same genetic pre-disposition, but most of them will never develop dystonia unless certain environmental triggers occur.

With musicians the environmental triggers can be intensive practice, sometimes in connection with a change of technique, or a change to another instrument, or extra-instrumental fine motor burdens, for example writing a lot. A late start with taking up the instrument has been identified as a possible risk factor (Altenmüller et al. 2015, p. 96).

Psychological triggering factors: Anxiety and perfectionism have been identified as factors that might lead to an increased risk of developing dystonia (Altenmüller and Jabusch 2009, p. 151). My experience is that individuals who have developed dystonia tend to be highly excitable, nervous, with a preference for multi-tasking. A blepharospasm patient of Dr Joaquin Farias* reported that years before the onset of her condition she always did simple activities like working in the kitchen, running or walking whilst listening to ebooks or podcasts. For a person whose nervous system is already 'noisy' the sensory overload of multitasking might be a trigger that could lead to the development of symptoms.

The emotional stress that comes from strained or difficult relationships can also be a trigger. Altenmüller (2022) mentions adverse childhood events as factors which can lead to unsuccessful stress coping strategies. Whether or not injury could be a trigger is still a subject of discussion amongst researchers.

The disposition plus the trigger might lead to fatigue and/or the development of sensory symptoms of various kinds. For example: a feeling of slippage on the string or body of the instrument. I recall a tabla player whose symptoms began with a feeling that the drum's surface was slippery. Strings might feel wet, or unusually thick; fingers seem to stick to the keys; among string players, an involuntary flexion of the bowing thumb, among woodwind and brass players, the loss of control of the embouchure in certain registers can be a symptom. Other symptoms are irregularity of trills and curling fingers (Altenmüller et al. 2015, p 94). In my case my throat felt rough as it would in the early stages of a cold. Christian Steineder, my colleague and a guitar player (who also became asymptomatic with the Alexander work) remembers a heaviness in his right arm and hand.

The reaction to all these sensations is usually to try harder, which often exacerbates the problem (a well-known fact among the Alexander Technique community). The stress level rises as control over movement is lost. Under continuing conditions of heightened anxiety and other stressors there is a

* Farias is a former pianist who was affected by dystonia, studied medicine, and established the so called Dystonia Recovery Program to support patients all over the world.

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pronounced risk of developing dystonia. Altenmüller and Jabusch (2009, p. 151) point out that psychological stress 'might induce the cascade of emotionally induced memory consolidation' of maladaptive motor programs.

It is important to understand that even after the onset of dystonia, the normal motor programs are not lost. Moments of normal function are experienced also.

The fact that symptoms are very individual, vary in intensity and are highly task specific is indeed puzzling. They can be triggered by movement (like walking), or posture (in torticollis), contact with strings, keyboard or mouthpiece, and goal orientation – wanting to be good, to perform well, to appear normal. One of the big issues for people affected by dystonia is a sense of shame for not being able to function normally. But why should one be more ashamed of the head turning the wrong way or of a broken voice than of a broken leg? My guess is it is the feeling that 'I should be able to control it' due to the absence of obvious signs of damage. Moreover, the fact that at some moments function is completely normal makes it all the more frustrating. People with dystonia become strangers to themselves, unable to understand what is going wrong. At this point people sometimes lose their jobs, face financial insecurity and often a loss of meaning in their lives.

If the person does not manage to step on the brakes at this point, symptoms can get stronger, affect more areas, spread from task specific to daily life movements.

3. Scientific models of mechanisms that cause dystonia

Fig. 2 shows models of the mechanisms which cause dystonia (according to Quartarone and Hallett 2013).

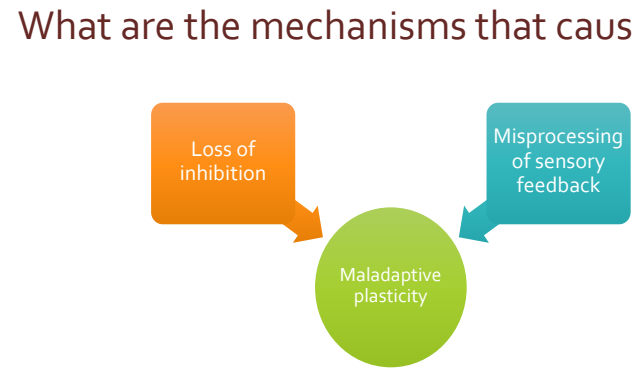

Fig. 2

According to Quartarone and Hallett (2013) *loss of inhibition and misprocessing of sensory feedback lead to maladaptive plasticity.*

In the following I will discuss what these terms, so reminiscent of Alexander's terminology (inhibition and faulty sensory appreciation), stand for in the context of physiology and neuroscience.

Inhibitory control in physiology refers to a process whereby neural activity patterns are suppressed, blocked or restricted in both space and time; it is the capacity to regulate/suppress tension and it manifests on three levels: motoric, attentional and behavioural. (Barron 2021, p. 85). Loss of inhibition means that there is an 'abnormal excitability' of motor circuits at different levels: spinal cord, brainstem, cortex, basal ganglia and cerebellum (Quartarone and Hallett 2013, p. 2). The clinical feature of dystonia is excessive movement. Electromyographic (EMG) recordings have shown abnormally long bursts of EMG activity. Farias (2012) speaks of a 'tail of activity' even after a movement is over.

It is likely that when a specific voluntary movement is generated (for example extension of the index finger), the brain has to suppress other possible movements (for example the extension of the middle finger). This is called *surround inhibition*. As surround inhibition in the sensory system allows for a more exact perception, surround inhibition within the sensory-motor cortex presumably allows for precision in movement. Surround inhibition has been shown to be reduced in focal hand dystonia (Beck and Hallett 2011, p. 1).

Inhibition is predominantly realised by inhibitory interneurons which release gamma amino butyric acid (GABA), the principal inhibitory neurotransmitter. (Barron 2021, p. 85). GABA is known as 'the brakes of the brain'. Some scientific findings report low GABA levels in dystonia (Levy and Hallett 2002, p. 93).

Misprocessing of sensory feedback: According to Quartarone and Hallett (2013) various mechanisms seem to go wrong in dystonia. I am only mentioning a few. You will find more information in the literature cited at the end.

Sensory gating describes neural processes which filter out irrelevant stimuli, preventing an overload of information in the higher cortical centres of the brain. The so called 'cocktail party effect' (the ability to listen to one speaker while being in a noisy environment with many different voices) illustrates how the brain inhibits input from environmental stimuli, while still processing sensory input from the attended stimulus. The 'cocktail party effect' demonstrates sensory gating in hearing, but inputs to the other senses are also gated.

Somatosensory temporal discrimination – the shortest time interval necessary for a pair of tactile stimuli to be perceived as separate – has been shown to be impaired in focal hand dystonia, meaning that the system does not manage to make correct sense of a tactile input.

Faulty motor maps – studies in patients with task specific dystonia revealed

a disorganisation of the normal homuncular finger representations of both hands in the primary sensory cortex (Quartarone and Hallett 2013, p. 4). It seems that intensive practice at an instrument in combination with a lack of sensory gating can lead to changes of the cortical representation of the body, for example, an overlapping representation of individual digits (two fingers mapped as one) which can no longer be moved separately.

Maladaptive plasticity is defined as behavioural loss and even the development of disease symptoms resulting from aberrant plasticity changes in the human brain (Cerasa et al. 2014, p. 1). This means that sensory motor programs are corrupted. Suddenly, instead of the lips closing around the mouthpiece, they are opening; instead of letting the vocal sound out, muscles choke; instead of turning the head, it is pulled down; instead of moving a pen with the fingers, the whole hand goes into spasm.

In the model of Quartarone and Hallett stress is not explicitly mentioned; perhaps to emphasise the neurological nature of the disease. Earlier, dystonia was understood as a psychological illness that could be treated with psychological means, which led scientific research down the wrong path for a long time. However, chronic stress is an important factor in the consolidation of motor memory and it is associated with a loss of neurons and synapses and may increase activity in certain brain regions such as the amygdala and the mesolimbic dopaminergic system, leading to hypertrophy of these structures (Altenmüller and Jabusch 2009, and Cerasa et al. 2014, p. 1). It has been shown that high stress levels and repetitive movements in monkeys have caused hand dystonia.

As Farias (2012, p. 57) explains, the nervous system learns by comparing. In dystonia we see that feedback loops which normally work in favour of improved outcomes are impaired. Normally, basal ganglia regulate the force of each movement. The cerebellum gives precision, correcting any errors in measurement by other parts. In dystonia, if the first sound (e.g. produced by a wind player, or a voice) is perceived as incorrect it is then dysfunctionally modified, producing a sound that is even further from the desired one (Farias 2012, p. 57). The same is true for movement, for example in hand dystonia.

4. Working with dystonia

As I have mentioned above, apart from the muscular symptoms, the whole person with dystonia is tense, nervous, excitable and can be prone to obsessive behaviour, such as obsessive thinking. The interrelatedness of thinking, emotion and movement is very obvious in dystonia.

Fig. 3 shows the aspects that I have found important for recovery.

In the Alexander work we experience how powerful it is when a person can calm down, and how this can lead to an integration on different levels: physical, mental, emotional. That's why I have put 'feeling safe' in the center of the table. The memory of my very first Alexander lesson is that of a very definite sense of security and calm after being guided in and out of a chair

Practical considerations

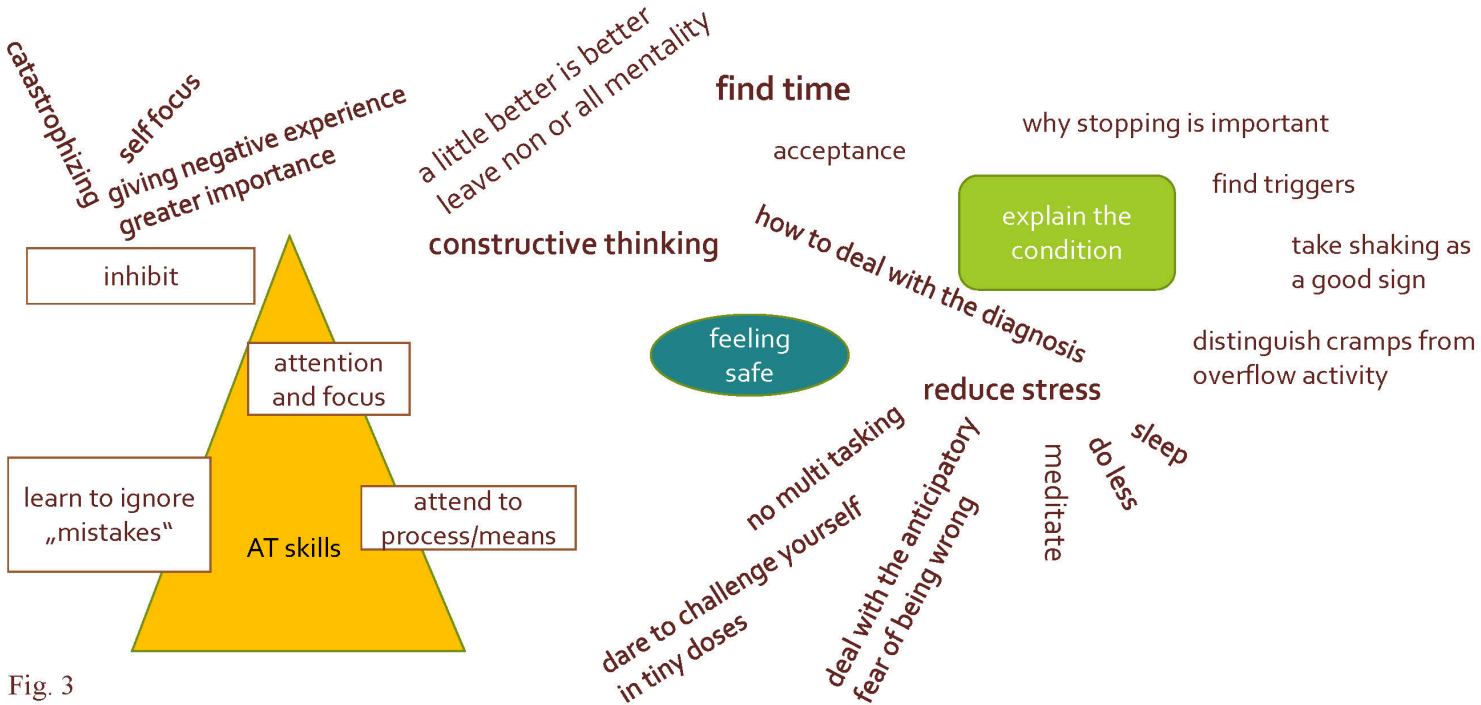

Fig. 3

by gentle hands. 'This sort of contact leads the pupils to greater awareness of their experience of themselves', as McDowell writes (McDowell 2009, p. 114). Whenever I had a lesson, afterwards everything would be easier; not the speaking itself, but simply the way of being and reacting. Christian told me that after his lessons, he experienced calmness and less obsession with his condition. In our article Christian Steineder and I wrote that 'dystonia is an addiction to muscle tension and excitement' (Mazek and Steineder 2018, p. 15).

Calming down and feeling safe is crucial, especially in the beginning. The client may slowly appreciate being calm as a possible and desirable state, but at the same time he might be concerned about 'getting to the point'. Therefore, what is very important, especially in the beginning, is information. The client may have been diagnosed as being incurably ill ('you will have to live with this', as doctors often say). Information about the science behind the condition can be helpful.

For teaching it is important from the very beginning to distinguish cramps from overflow activation, and tensions. The most obvious sign is cramping in particular areas. But there is also overflow activity in muscles that can be controlled, for example, lifting the shoulders when trying to speak, excessive facial movements like frowning accompanying certain movements or activities. In torticollis various neck and shoulder muscles tend to get involved when moving the head.

The dystonic person might think that all the tensions they experience are due to cramping, but a lot of it is simply misuse. For the teacher it is important not to work directly on dystonic muscles.

Dealing with tremor: Tremor is an involuntary, somewhat rhythmic movement. Farias (2012) says that apart from the hypertonic musculature, there are muscles which are hypotonic: Muscles which do not send much information to the brain and which do not receive much activation signal. Sometimes these muscles, when put back to work, react with shaking. Tremor can also occur before the onset of dystonic symptoms. It would be a good thing for the client to allow the trembling until it subsides, rather than trying to control it. Farias (2012, p. 30) states that tremor points out the area that should be reorganised. My experience is that often an ill-designed movement plan will bring about tremor, e.g. lifting a shoulder and pulling the neck down in order to bring a glass to the mouth. In that case the Alexander teacher can assist by indicating how to approach a movement in a more integrated way.

Find triggers: lack of sleep, preparing for a trip, visitors, new situations, even positive stress, a happy event, etc. can bring the nervous system to an arousal state which is then reflected in an increase of symptoms. Finding triggers means getting to know one's self and one's own reactions better and to eventually become more able to sail serenely through the challenges of life.

Acceptance: Accepting the condition and finding a deeper meaning behind the problems that present themselves is a process that is part of healing. It

is the client's own inner journey. It is good for the teacher to remember that although dystonia is very disruptive, there are still many things that can be done even with dystonia and that dealing with it may exactly be what is needed on a path of personal transformation and evolution.

Reduce stress:

Number one: *Get enough sleep.* When the nervous system is in 'overdrive' sleeping will be a problem. Taking time to become balanced and untwisted before sleep have been very important in my recovery. Constructive rest before sleeping, or doing some simple movements that restore balance is advisable, because the twists and one-sidedness, which we find in dystonia, increase with fatigue.

Number two: *Avoid multitasking.*

Dare to challenge yourself/do less: There is no gain in avoiding all situations that put one under stress. Christian Steineder suggests to see them as opportunities to grow, which will lead to a change in perspective: rather than trying hard in order to 'succeed' one could enjoy the journey even if it involves setbacks. For me, meeting a new client or talking in front of groups was a challenge for many years. But every time I did it, it gave me a bit more confidence. Any particularly challenging event should be countered by periods of rest and 'boring' normal days. On the other hand, creating a crazy timetable without any quiet moments is something that has to be seriously questioned.

Dealing with the anticipatory fear of being wrong: When we are in a situation where we cannot control the outcome of speech, the movement of a limb or the movement of our head or face, we rapidly learn to catastrophise, self-focus and to overemphasise negative experience (just as in stage fright). The fear of being wrong in itself often triggers symptoms. Therefore learning to think constructively is crucial: this includes letting go of an 'all or nothing' mentality, and learning to notice and appreciate small improvements. Shift the focus from 'how am I doing' to the task itself, on what we want to deliver. Over the years I learned that speaking became easier as soon as I forgot about myself and just attended to the content of what I was saying.

Learn to ignore 'mistakes' and not to react to the sensory input (for example, of what we hear or feel). Remember, feedback loops that normally work towards improved outcome are possibly dysfunctionally modified in dystonia. The way out is to ignore: ignore how the voice sounds, ignore the involuntary movements, inhibit trying to do better directly; ignore the breathy sound from the trombone, learn to inhibit taking direct steps in reaction to some sensory impressions. What also works is to think 'I am not doing this': I am not playing, I am not speaking, I am not walking, I am not writing. Just as Alexander advised to 'not get out of the chair'. 'Learning in this way', as Ted Dimon (2015, p. 75) writes, 'requires the cultivation of an attitude of detachment; one must focus not on what one wants to accomplish but on the process of getting there'.

Directions and inhibition: Andrew McCann (2019) writes: 'And if problems

with posture correlate with difficulties with inhibitory control, then mindfulness practices may be as crucial in improving posture as any kind of posture exercise. And this is at least partly why we spend so much time in Alexander lessons cultivating the skill of inhibition, especially in our most compelling activities.' Directions will be of benefit after the client has fully understood that they are not supposed to directly change movement outcomes. Then the importance of the practice of 'quietly directing' can be explained: going through parts of the body repeatedly in the same succession and asking for release. Sitting or lying and directing without 'doing' anything is hard for the person in permanent overdrive and it is absolutely necessary.

Meditation: The practice of 'quiet directing' will result in release, but it is also a practice for focusing the mind. For me, learning to direct the mind is indispensable. (Especially if one wants to stay away from benzodiazepines, anticolinergic drugs and serotonin reuptake inhibitors as much as possible – these drugs are prescribed as aids in recovery (Altenmüller 2022).) Meditation is inhibition and direction. It is a practice in perseverance, because I just do it regularly no matter whether I like it or not. My experience is that many positive psychophysical changes have happened through my meditation practice: untwisting, release, and emotional healing, to name a few.

One of the most difficult conversations with the client is about the need to give enough time for this re-education process which is also a process of healing on all levels: body, mind and soul.

Practical procedures: In fig. 4 I have outlined a few procedures which I find helpful. All people with dystonia with whom I worked have twists. Often the awareness of the internal axis is confused. To understand these twists and to get out of them and establish an improved idea of the axis of the body is important learning. Perhaps connected with the twists is a marked difference between left and right. Farias (2012) speaks of a 'lack of connection between the two brain hemispheres'.

I find intentional twists in standing and sitting very useful for clarifying the differences between left and right and for re-defining the midline. Same for shifting weight from left to right in standing, while always defining when crossing the midline. Becoming aware of the orientation of the pelvis in relation to head and shoulder girdle is a very important practice. Often the pelvis is twisted or tilted to one side. Especially when working with people with torticollis, where access to the head balance is very limited, attending to a better balanced pelvis is a possibility.

Another important topic is the eyes. Often eye movement is totally out of alignment with the task in dystonia clients. In addition, if the head is habitually tilted to one side, the eyes will hold on to the experience of a tilted axis and have to be re-educated. Horizontal tracking while taking care of a well-aligned spine is a good way to approach this.

Rhythm is important in the organisation of movement. When we walk, we have an internal metronome working, though not consciously. Speaking

Practical procedures

avoid working on the hypertonic muscle

strengthen weak side/part
re-connect „unmapped" parts
find the areas, which person does not feel clearly:
help to re-establish feedback from body to brain by touch
vision – seeing oneself/others

finding support through both legs/untwist
noticing the difference of left and right side
(toes, pressure agains soles of feet, noticing direction of the sacral bone in order to understand if there is a twist)
explain the need for avoiding unnecessary twist in everyday activities

movement is organized in time and space
attend to body's inner metronom
walking – speak the sound that is expected from the feet
rhythm of movement
drumming
dance

define the axis of body
turning around axis

attend to motor maps
find out what they think
do not take anything for granted

general
take full responsibility for a movement as teacher
guiding through the problematic movement…
torticollis table: taking weight and moving head

tongue
tip of tongue behind upper/lower teeth
back of tongue: ng and a
half circles upper/lower lip – continuous speed

eyes
align eyes with task
horizontal tracking – awareness of axis
crossing midline- where is the front?
detect and understand the twists

voice
mmmm – strengthening hypotonic diaphragm
salt exercise
variations on whispered ah procedure

Fig. 4

the sound that is expected from the feet while walking can be helpful. Or sometimes the task can be to ignore the sound, for example the full support of the leg in walking is established a bit after the foot hits the floor. For a client who has a dystonia when walking and standing, it is important to understand the difference in timing between the sound of the footfall and the actual full support moment. There are many variations to this. It is important to consider that movement is organised not only in space but also in time, and a lot of confusion can result from a lack of proper timing. Dancing and drumming are good activities in the recovery.

In spasmodic dystonia doctors note the spasms of muscles controlling the larynx, but in my experience the hypotonic diaphragm is very much part of the problem. When the diaphragm is hypotonic 'mmmm' sounds can be a good starter, putting hands on the belly and feeling the movement. Find variations of the whispered 'ah', if it is too difficult. The 'salt' exercise is perhaps a good example of how to approach the recovery training. We first establish awareness of inhalation and exhalation, then exhale on a 'sh' (like in 'shoe') sound, hands on the belly, feeling the gradual inward movement, then after part of the air has escaped on the 'sh' sound, say 'salt' ('Salz' in German), and then continue the exhalation on 'shshsh' while all the time attending to the belly moving inwards without pressure. The awareness of directions and inhibition of unwanted movements (tensing neck, shoulders, tensing legs, etc.) is underlying the task. Such a practice can take months or years to be well established for someone with dystonia. But when it is mastered, it is the blueprint for approaching all movement or sound tasks.

The task for the client is to forget the dystonic motor programs and to forget about being afraid of the wrong thing. From my own recovery I can say that over years the focus has shifted from the voice to the whole. Yes, there is a need for detailed understanding and for improving motor programs: what does the jaw do when the tongue moves around the lips? What happens to the widened shoulders as we move our digits? We sometimes have to deal with details. But the main step that needs to happen is that overall I can access a level of calm and expanded awareness that allows me to attend to directions instead of listening for and reacting to 'mistakes'.

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