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RESEARCH ARTICLE

Tone- Increase is an Answer after a Brain Damage: But How High Is Good?

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ABSTRACT

Introduction.

Every neurological disease has an clear reaction of the damaged brain to get again control over the situations that it is copy with. This article focuses on this reaction on that damage of the brain on the restoration of movements, attitudes and balance.
This is on one side, called plasticity or recovery but also is it an great part adaptation.
Necessary is this adaptation to have again possibilities to gone on with their life, certainly when the recovery is stopped and the chronic stage is entering. Then we see all kinds of problems, especially in the chronic stage that attack the reached recovery levels and much of this people must go on an lower level because they cannot win the fight.
That count also for people that have a degenerative neurological disease as Parkinson, Multiple Sclerosis but also for Dementia.
To hold the level is maybe the greatest challenge for stroke-survivors but also people with an degenerative neurological disease go often at an certain level to fast in their performance back an become total dependent of others on an moment that there is an situation that own movements are very difficult.
This fact, that movement on the own are so heavy that the amount of energy that this movements cost, must be an item that must have our attention and an important item for the treatment.
That looks the conclusion often simple: the tone that is present in the body, is often so high that movement with this high tone cost much energy.
This fact was for us the focus to create an treatment that would try to control the tone and make more and less heavier movements possible.
This by people in the chronic stage and after an stroke, but also by people with the diseases Parkinson and dementia.

Method.

Measurement of the tone was common by all survivors of stroke and Parkinson but by people with dementia was this "not done". Till in 2005 we started with the administrate of all tone measurements by all people with an neurological disease and that were done on divers moments through the day to get an view, what the tone did through the day and to get an impression what the best approach could be, to get control of the own movements so long as possible.
But also, to get an impression what the energy cost where of this people through the day and what the contribution of the tone was.
One of the first data was that for much people with an neurological disease the morning was an "Fight against an high tone and only movement could bring that tone to an lower level, another moment was long sitting or better long in one attitude".

This fact that the start was difficult, because the tone was (too) high was clear but more important was the fact that starting with movements was essential to get an lowering of the tone.
Thus, tone decrease was good possible with movements and when that movements were not too heavy, should this make an start possible that cost less energy.
Thus, in bed doing light movements, has more effect as starting with an A.D.L. program and transfers.
Movements in the beginning can create an lower tone and has after that, an direct positive effect on the level/speed of the A.D.L. performance and the transfers.
In an period of an half year we train according the principles that was based on combination of Burnnstrom and on the new evidence that was published in the first Guidelines of the stroke- treatment that was published than.
After that period, we treat the same people with an approach that focus on tonus control with as base practice an (modified) Bobath- concept but also with treatment in an environment where the tone stays lower.
This (Modified) Bobath (N.D.T. -Neuro Developmental Treatment)- concept had two important aspects;

1. Tone control and movement stimulation. The tone control is the modification.
2. An continue search for a possibility to integrate this movements in the A.D.L. so that the movements were daily used.

Results.

The group that in the first treatment-period, react with tone increase and less movements and more dependency, was changeable in the second period in positive result.
This approach to get an tone under control was effective and that by an group that has an tone increase during 6 months. Still an clear(clinic relevance) decrease in 6 months was possible to an lower level and better scores A.D.L. and transfers.
There is no static analyze done by this investigation but the increase in possibilities of the participants was an “prove” that tone control is an essential part of an treatment of people with an neurological disorder and should be an base element.

Conclusion

We have neglected the importance of tone control by people with neurological disorders and that will be the bill that people will pay when the disorder is out of the sub-acute period.
Then will no tone control create mobility loss and an adaptation on an lower level because movement with an high tone asked much more aerobe and anaerobe power.
This is not only the case by movements that involves the whole body and will create a lower walking possibilities and balance but also for movements in the limbs as the mobility of the ankle or that of the hand. High tone will make movements there almost zero and will create mobility loss but also will this let disappear what the arm or leg could after the neurological disorder.

High tone will destroy the selectivity that was there!
Authorship Credit: “Criteria authorship scientific article” has been used “Equal Contribution” (EC)

Introduction.

Treatment of people after an neurological disease is always an challenge, this because there are so many different forms of, in which this disease or better disorder manifest.

In this article only the motoric problems stand primary.

An damage of the brain will give in the -motoric- part, possibilities and an great scala of manifestations and that will create also an great amount of theories how that occur and that give even more approaches how to treat this manifestations.

This struggle between ideas was the last 10 years manifest in the Netherlands and was the start of an new approach with scientific base. [1,2,4]

But this start seem only possible when the approaches [3] that than were active, were replaced in an whole new approach. This make that the way people were treat within that period, changed in an total different approach, were the "distance' of the therapist was greater because the approach was more hand off instead hands on.[6]

The effect was that within that 10 year that the system of multidisciplinary working was leave and that an scientific approach was started and let an great group of expert stand on the side line because often were the investigations restricted to an minor group.

The group that was investigated was the group in the hospitals and rehabilitation centra.

That means that the group in the Hospital was investigated to get large numbers of different types but the group of the people that has after an stroke that new rehabilitation aprroach was limited to 10 % . And that 10 % of the stroke survivors had good opportunity to get such an recovery that returning to their home was possible.

Other neurological disorders were investigated in the Hospitals but after that there was little investigation of what the reason was, why their functioning get worser.

An good exception is Parkinson-net [7] that try to follow the patients from the beginning till the end and it this approach that will give us answers, why or what the main cause is, why people with an neurological disorder get worser in time.

Of course, is there the progression of degenerative diseases and of course will this have an great influence, but there are other causes that has an negative effect on this neurological disorder and decrease the quality of life of much people with an neurological disorder.

Further one is there the decline of so many people after a stroke as the rehabilitation programs are stopped or decreased and there is an decrease of the level what they had achieve with so much work.

The new approach that started was based on the principles of scientific research that pointed that the increase tone, was an "blessing" for the people with an brain damage because now where the control greater and could the brain control better the movements.

Together with the approach to let people search for the best way, were this the important pillars for the new approach.

To get this developmental clear, an short history of the treatment of people with neurological disorders.

Short History of the treatment of people of neurological disorders.

The treatment of people with an neurological disorder was for long an treatment that hasn't an theory or only the fact that an damage in the brain was permanent and not reversible.

Therefore the Motoric treatment was :

An sling for the arm, an long braces from the shoe till the hip and an four point stick and try to walk with it.

The problems on ADL was often an case for the caregiver of the patients, there wasn't an attempt to get an independency or the person must go for it, but the idea by the therapist wasn't there that there could be an recovery.

At the end of the years 50 of the previous century there is an attempt mostly of the best-practice to change this image. The work of Burnnstrom[13] and the Bobath's and others [8,9,10,11,12] had as base that recovery was possible but that we must follow the stadia of that recovery and stimulated that [13], or search for an connection with normal movement within an 24 hours setting and learn the patient to move with the best possible tone in that movement, that can be use through the day and introducing also an way of dressing etc. with the remaining possibilities.

In many countries known as the NDT -approach (Neuro Developmental Treatment).

Then in the last decades of the previous century and in the beginning of this century there is a huge scientific research and elements as plasticity, recovery, hands off- approaches but also an searching for elements that are positive after an brain damage as the spasticity and negative aspect as loss of muscle power and the great opportunity to counter the negative motoric elements with an positive outcome. [15,16,17,18,19,20,21,22,23]

The group patient that was investigated, was the group that has suffer from a stroke and was treat

in rehabilitation centers and on a minor scale also for other neurological disorders.
This approach was translated in treatment with an higher intensity or "More is better" [24] and lead to an return of the forced use [25] approach, now translate in the CIMT (Constraint Induced Movement Treatment) [26], that has very positive effects by people that has the "disuse" problem.
Disuse is an symptom by people after an stroke, that make no use of the possibilities in their affected hand but that possibilities are still present. An very important but restricted group people because there isn't an total damage of the projection in the hand /arm.
Now the discussion is in the next phase, because the word intensity must be defined and that lead to other approaches, especially in the beginning and by younger people. There is an improvement of the treatment on quality level by an very high intensity (heavy and often). But by the others is the quality of the treatment almost equal with the level as before the new approach.
And there is an discussion about the level of the investigations (TIDieR -level [27,28] and the mantra "more is better"[29].

The level of the results is by most survivors of a stroke isn't increase, especially the people in the chronic stadium of stroke, but also the people with a degenerative neurological disease has not the benefit that we expected after this scientific progression.
Sure, in the acute and subacute are clear better results, that are reached by an better application of the intensity. Was this first "more time" now there are clear signs that an good heaviness give the results over an greater period of time with an huge amount of rehearsal.
Still, this is only done in special rehabilitation center and regrettable, has the greatest group of stroke survivors and people with an neurological disorder in an late stadium no benefit of it.
We still waiting for an clear definition what intensity etc. means for neurological patients to give everyone the treatment that he/she deserved and we can translate to the other group.

Chronic stadium with a neurological disorder, what is the best approach?
Start by survivors after an stroke after 6 -12 months, than is the spontaneous recovery over his greatest progression and should bring the reorganization through the plasticity of the brain and treatment the recovery on an further higher level.
But fast was it clear, that there are evident exceptions and that is especially the arm and the hand, because when the cortical -spinal pathway are complete or for an great part damaged than was an normal dexterity of the hand impossible. This is despite all great inventions of robotic that can move hand and arms but are now not capable to create an new projection in the brain.[30,31,32,33,34,35,36]
Still there were people that regain some ability in the arm and hand and hold that in the chronic stadium and the great covenant was always the level of usage of that affected side.
Thus this is another disuse as mentioning before, this is an arm/hand dexterity that has an great use in daily rhythmic and were therefore always make an lot of movements.
The same seem also the case of people with neurological disorder in a latter stadium or stroke survivors when the movements through the day goes difficult and cost more effort and we must thus also find out why this is in so many cases the case.
Of course, is there an increasing age, decline in motivation, progression of the disease, to low intensity and frequency of therapy but that look so easy, because often it occurs when people go to their home after the rehabilitation or were hospitalized in a long care facility.
People that are coming at home, must find their possibilities to move and live on the level that cost not a huge amount of energy. Many professionals working in inpatient situation are surprised how fast people lost their ability and have much more energy need to do the same as she did when they were inpatient. Professionals that work in the periphery, see that the "motivation" is lower but also that the cardio- vascular condition is decreasing.
And of course, there are people that have more trouble to hold the motivation to exercises and do the A.D.L., but most complain that the same movement is heavier now than when she was inpatient.
What is than changing, of course the environment that is at home always heavier despite adjustments, but many professionals in neighborhood give on that the mobility is often fast decrease and that an great amount of the time must be pointed on stretching. This is pointing on an reason (mobility loss and stretching) that movements are more difficult as before.
Thus it is essential that we invest what are the greatest changes that occur in the chronic phase when people are at home and where treated in their environment.

What is than changing at home?

Of course, often the amount of movements that is done by caregivers. Caregivers has the tendency to help fast, but still observe how fast that dressing is becoming difficult as before and make the comparison with the technique and speed, when he was inpatient and some months later at home, and that is often very clear what is changed.

Then can it be a link to the environment but par example the speed to slip in the sleeve of the sweater is often after a few months clear reduced, often is the person not capable to hold the arm in a good extension and the elbow go by the movement faster in flexion and make the movement through the sleeve difficult.

Thus, the most remarkable aspect was the increase of the tone (spasticity, rigidity, paratonia) in the shoulder, elbow, hand but also the feet and later on in the adductors/flexors of the hip.

Tone that reacts in clear stereotype movement possibilities as the pathological neurological synergies but we look often only to the limbs but the synergies start always in the trunk/neck and the tone increase will also start there.

Investigation.

We were convinced that the new research's together with our skills out the neurological treatment approaches, must be give an clear better outcome as the treatment we did at that moment.

But we want also get these new approaches possible for the other patients with neurological disorders as Parkinson and Dementia.

Investigation was done starting in 1995 by people with Parkinson and Dementia and people after an Stroke, but now we want to know what will happen with people after an stroke, Parkinson and dementia when we introduced the new guidelines in their treatment.

We use the guideline as base,but we found the practice on the ward or at home on the level of movement in their environment and their A.D.L. too important to leave this.

But the tone inhibition was lesser and therefore the heaviness (intensity) higher and with an higher frequency as be invest as the key-stone for an better result ("More is Better")

The group characteristics

Table 1: Investigation of the relation between therapy/ transfers and the level of the muscle tone

	Stroke	**Parkinson H&Y > 3 [42]**	**Dementia**
Number of participants on this investigation	30 (20 man and 10 female)	15 (8 man and 7 female)	30 (15 man and 15 female)
Age	± 59 years	± 71 years	± 75 years
Measurement method	Modified Ashworth scale (MAS) [37] and Tardieu scale [40]	Part 22 of the UNIFIED PARKINSON'S DISEASE RATING SCALE (UPDRS)	Modified Asworth Scale for Paratonia (Mas-P) [39] and Tardieu scale.[40]
Period	2002-2005	2001-2005	2000- 2005
Previous stage	Rehabilitation centre or short period at home with therapy in their living place, now inpatient or policlinic	Hospitalized on a somatic/ psycho geriatric department in a long car facility and nursing home	Hospitalized on a psycho geriatric department and are capable to hold the level 3(Rakt scheme) [41]
Therapy first six months	An intensive program with the focus on better walking program and less on the possibilities of the arm and hand. According the Guideline.	Program that focuses on the movements as walking (stair) and standing up Transfer training on the department 2 times a week	Program that focuses on walking and standing up with also an transfer training on the department 2 a week.
Intensity First period	Aerobe (Moderate < 70% of the heart rate max. Anaerobe, Task specific resistance almost 80% of 1.R.M.	Aerobe (Moderate < 70% of the heart rate max. Anaerobe, Task specific resistance almost 80% of 1.R.M.	Aerobe (Moderate < 70% of the heart rate max. Anaerobe, Task specific resistance almost 80% of 1.R.M.

Treatment First period	Inpatient: 2 times a day about a half hour on the physical ward. 2 times a week transfer training on the ward Policlinic; this group 2 times a week 45 minutes.	2 times a day about a half hour on the physical ward. 2 times a week transfer training on the ward	2 times an day about an half hour on the physical ward. 2 times a week transfer training on the ward

The two elements aerobe and anaerobe intensity were products of the new approach that focus on training on an higher level. Aerobe with an heart rate increase of 70% and the anaerobe almost 90 %. Because an higher level was only one movement and we want rehearsal. This part was often lower because the amount of resistance was too high to do an task-specific training with resistance.

Table 2: The first period of training with the intensity as in table 1

	Stroke	**MAS and Tardieu scale**	**Parkinson**	**Part 22 (UPDRS)**	**Dementia**	**Mas-P and Tardieu**
	Start	After 6 months	Start	After 6 months	Start	After 6 months
Shoulder blade Retraction	2-3	3	2	-3	2	2-3
Elbow flexion	2	2-3	2	-3	1-2	3
Fingers flexion	2	3	2	2	1-2	2
Hip						
Flexion	1	2	2	3	1	2
Adduction	1+	2	2	3-4	1	2+
Foot						
Plantar flexion	1	2-3	!+	3-4	0-1	2

Conclusion after the first period:

This program was the reason that the tone increases and that lead to an lower possibility of movements of the participants and the main reason was that the tone reach an level that only an few stereotype "movement" were possible or ended in an stereotype attitude.

But this therapeutic program was partly responsible for this tone progression, clear was that the movements in the ADL - the transfers- evoke also tone increase. The participation of the caregivers on the ward was on the transfer area too low and that was translate in "pull"-technique to get people transferred.

This aspect was clear present by the people with Parkinson and Dementia, but we have this also verify by the participants with a stroke also at home. There was also an connection but not so clear as by the people with Parkinson and Dementia.

But by the stroke participants was the fact, that shoulder retraction (The flexion movement/ attitude synergy) was increased in tone a sign that the training of the walking part, [43] has an negative effect on the shoulder and the arm cannot use anymore, also the elbow and hand.

An important aspect to get a paretic hand/arm on an certain level and to hold that on that level is that this hand/arm must be used on an daily base.

Not that this must on high level, the most important part is using on daily base!!

Increase of the tone in the shoulder will break that fast!!

Because movement is too difficult!!

Searching for an answer! These results were so disappointed that this occurs, when we introduce the new insights in the treatment and therefore, we search for a better way and better results and we want start with the group that has such an increase of the tone.

The second period of the training with a different level of intensity.

The reaction of the tone determinate what the level of heaviness must be alter.

But we introduce also changes in the environment to hold the tone under control.

The accent was lying on more movements, with when possible greatest speed, because than was it certain that the tone was under control.

That means, that the resistance must much lower to reach more movements with speed.

The same group of participants that has participated in the program of table 1 and 2, where now included in this program pointed on **tone control**.

This because we had achieved in that group a tone increases and also by all participants an lower level of functioning.

After the first period of training were this some results:

The walking performance was lesser, but also the speed and the distance were lesser.

The independency of the ADL movements in, out and in bed, from the chair, toilet etc (measure with T.C.T. and T.U.G) had need of more assistance for all participants in the group Parkinson and Dementia. By the stroke group was this not clear but the movements especially in the T.C.T. were slower.

Furthermore, was this the possibility to see and experienced or another program could decrease the tone and or that tone decrease has also an positive effect on the movements, speed and independency.

By the participants with a stroke was an extra focus on the decrease of the tone of the scapula and more reach possibilities of the arm.

That reach movement was used to get the arm participating in support and faster in the sleeve of the sweeter tec. More ADL related movements that must use often through the day.

Clear when the hand function was poor of even absent, was still this movement important but it must be used.

Table 3: Participants in the second period

	Stroke	**Parkinson H&Y > 3 [42]**	**Dementia**
Number of participants on this investigation	30 (20 man and 10 female)	14 (7 man^ and 7 female)	30 (15 man and 15 female)
Age	± 59 years	± 71 years	± 75 years
Measurement method	Modified Ashworth scale (MAS)[37] and Tardieu scale [40]	Part 22 of the UNIFIED PARKINSON'S DISEASE RATING SCALE (UPDRS)	Modified Asworth Scale for Paratonia (Mas-P) [39] and Tardieu scale.[40]
Intensity Second period	Aerobe (Moderate < 70% of the heart rate max. Anaerobe, Task specific resistance 50-75 % of 1.R.M. This in tensity may never lead to an increase of the tone.	Aerobe (Moderate < 70%) of the heart rate max. Anaerobe, Task specific resistance 50- 75% 1.R.M. This in tensity may never lead to an increase of the tone.	Aerobe (Moderate < 70% of the heart rate max. Anaerobe, Task specific resistance 50-75% of 1.R.M. This in tensity may never lead to an increase of the tone.
Treatment Second period	Inpatient: 2 times a day about an half hour on the physical ward. But now 3 times in an week in aquatic therapy according Halliwick etc. [44,45] 4 times a week transfer training on the ward, were the search was to hold the independency with little facilitation [46]	Still 2 times a day therapy but now was this minimal 2 times a week a therapy session in the pool. The transfer training on the department was increased to 4 times a week, to get an transfer on an level that it was not to heavy and with no assistance but facilitation*	Transfers training 4 times an week and at least ones a week aquatic training in the pool. Further was there an extra training for the workers on the department to learn to facilitated and searching for problems in the environment that makes dependent movements difficult.[49]

	Policlinic; this group 2 times a week 45 minutes. But a part was aquatic therapy and more training in ADL situations.	In the morning before the A.D.L. the person receives an block under the foot-sole, on such a way, that pushing away was evoked for 20 minutes. **[47]	Also, when the tone was very high after lying in bed start first with the Push-away orthosis.

^One man was died before he could participated in the second period.
*Difference between facilitation and assistance.
**Push Away Orthosis.
*Facilitation is an technique were the normal movement is supported, assistance is often "take-over" and often with not normal movement performance. Assistance was often an tone increase action, pull someone up, asked from the person, that is pull up, muscle activity to give an fast point where the caregiver can on pull.
**Push Away Orthosis is an construction that is placed against the feet and on such an way that participant has tendency to push it away. This action inhibit often the tone and makes movement possible.

Table 4: The second period of training with the intensity as in table 3

	Stroke	**MAS and Tardieu scale**	**Parkinson**	**Part 22 (UPDRS)**	**Dementia**	**Mas-P and Tardieu**
	Start	After 6 months	Start	After 6 months	Start	After 6 months
Shoulder blade Retraction	3	2	3	2	2-3	2
Elbow flexion	2-3	2	3	2	3	2
Fingers flexion	3	2	2	-2	2	1-2
Hip						
Flexion	2	-2	3	2	2	2-
Adduction	2	1-2	3-4	2	3-4	2-
Foot						
Plantar flexion	2-3***	2***	3-4***	2***	2***	1***

*** All tone measurement is an average of one day, count for all tone measurements in both periods. The difference through the day was certainly by Parkinson and Dementia great, in the morning and at the end of an long period of sitting was the tone often much higher but when we take an average was the tone after the second period significant one level lower.

Conclusion after the second period;

1. Tonus control was possible and it was possible to get the tone by all participants on an lower level, almost on the level of an year ago.
2. The movement possibilities increased, standing up, walking distance and step length but also the movement in and out bed.
3. And this was possible by participant of different neurological disorders and lead every time by everyone to more possibilities and an lower tone.

Attachment Part 22 UPDRS.
Judged on passive movement of major joints with patient relaxed in sitting position.
Rigidity
0 = Absent.
1 = Slight or detectable only when activated by mirror or other movements.
2 = Mild to moderate.
3 = Marked, but full range of motion easily achieved.
4 = Severe, range of motion achieved with difficulty.

Few examples of not good tone control and the consequences.

Example 1

The question that we must investigated, is:
How important is this control of the tone from the beginning.
Known is that the striker foot develops by people with a sever stroke almost on day one [49,50].
This tone increase, is also a necessity for the patient to create an stability but that tone increase will change the muscle structure and length.

The same we see by people with Parkinson and Dementia and our program (second period) could decrease that tone and the loss of mobility was not complete restore but an clear effect was present.
We know that many people after an stroke with the problem - the foot-control-, receive an aid that "fixated' the foot in an neutral position between dorsal- and plantar flexion and between inversion and eversion. Especially the dorsal – plantar flexion ash, is then also not mobile.
That will lead to an restriction as an striker foot [49] with an dramatic change of the walking pattern.

Photo 1

Photo 2

Photo 3

Photo 1, 2 and 3.
An example of a loss of mobility in the ankle joint through a combination of less control of the tone and the changes in the muscles and other tissues.
The rigidity of the AFO (Ankle Foot Orthosis) will stop the movement and that isn't tone control. The tone will increase and will after (in this case 2 year) care for a striker foot and a much lesser walking pattern as an adaptation for this striker foot.
When from the beginning was search for a stability with movement, was there more tone control and a less change of mobility loss.
What we see as a positive effect of this foot fixation is the swing of the arm in the end of the stand phase and end of the swing phase, here is the tone good because there is a movement possible in the walking performance and that is sign that the heaviness is of a good level.

Example 2.

Photo 4

Photo 5

Photo 6

Photo 4, 5 and 6.
Exercise in stair walking after an stoke, beautiful done in the centre but also in the shopping centre. Immediately that what is learned, searching for an training that people it can use everywhere. Than we know that this is use optimal.
But look at the paretic arm, the position in the whole arm from shoulder, elbow and hand is the same. That means that the tone will increase when she walk stairs and now is there an danger that this tone will change the mobility but also the possible movement that are possible in the arm and that this attitude will be permanent.

Example 2 give us two possibilities and that must be the choose by every patient with a neurological disorder and tonus increase.

1. A better fixation of the foot (photo 5) that also will help in the stand-phase without a fixation of the ankle only the eversion -inversion ash. That makes placing and standing on it easier and will therefore not asked for a long period standing and controlling on the not-affected leg because that will stimulate the back diagonal an increase the tone in the shoulder blade.[43]
2. Or/and a treatment after this stair walking of the upper trunk and arm with a component what she could use in the daily situation. This tone control treatment with correct align of the alignment is visible in a study of Swiss IBITA [51]. But that means that every time after a treatment with a too high heaviness this arm attitude will develop and will asked every time an treatment of the alignment with tone control and an training from activities on daily level. In chronic stadia will this often necessary, but also in the acute and post-acute should that heaviness be recognized and copy with it.

This reaction of the upper trunk on an too high activity of the not-affected leg will be seen by many persons after an stroke and that will have an negative effect on the tone of the upper trunk, thus the affected arm and an reaching movement of the arm will be decreased.
What this has for an effect on the possibilities of the hand isn't clear but there are signs that the hand direct after the stroke (in the acute phase) with possibilities in the hand, that loosed after the period (6-12 months) because of the lost "movement-possibilities' of the upper trunk, shoulder and elbow (wrist).
The loss of movement in the shoulder and the increased tone has also a negative effect on the possibilities of the hand and in the chronic stadium is every arbitrary possibility often gone.

No movement in the arm, will mean no daily use and a loss of the possibilities, that were there in the beginning.
By people with Parkinson disease and with Dementia is this high tone in the upper trunk often the first reaction to controlled the balance and we see than more flexion in the elbows.

Conclusion

Two decades ago, the treatment of people with a neurological disorder goes in another direction, not the tone inhibition was essential but the using of what the damage brain could give. People with a degenerative neurological disorder tell us that this increasing of tone makes movement and independency impossible.
And what we see by stroke patients in the chronic stadium? We see also by this people increasing tone that make A.D.L. to difficult and the reaction of everyone is with medicines / injections even, operations to get the tone lower or correct the effects of the high tone.
Thus, it is clear that there must be tone control from the beginning and for the whole affected body and still must be there a treatment with a good intensity, great amount of time and high frequency with an transfer to the A.D.L., from the beginning and adapt on the recovery that where achieve or when there is an decline.
And we have the tools, we have weight control system, we have system that take over the heaviness of gravity and we have training environments in which the gravity is less – treatment in the water and that treatment in water had also a direct link with A.D.L. activity before and after it.

Tone control is a must for all people with an neurological disorders!!!

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