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# Physical treatment of individuals with dementia. Part 1B. Assessment- WHY.

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## Abstract

Part 1B makes the assessment further complete again with an the translation through an case description. The translation start with:" What is normal movement of this gentlemen and How can the environment help to optimized his independency. In part 1 A, there is an description what the approach must be to get people with dementia in an exercising treatment plan and also the cooperation of the other members of the family and others. "Their home is their castle " is everywhere in the world present and it is not logical that professionals are coming in their home and say what must be done. The change that this will succeed is very limited. In the Netherlands the approach EDOMAH is investigated and that show that it is possible when there is an conversation between the individual and the family about their wishes. And the wishes are the start for an better treatment plane and that is often, at the start, not the conclusion/wishes of the professional. This process, that people talk with each other and – maybe the most important issue- have confidence in the expertise of the professional, lead often to an situation that exercising and adaptation of the environment to get an better independency of the individual with dementia. In the Netherlands are family doctors starting with an approach that able the individual and his/her family to stay at home and get the family doctor at home on regular base to discuss the problems and what has to be done. In this approach are other professionals introduced by this family doctor and one of the most important elements, is that the people that comes at home are always or almost always the same and there is base that is needed to get an optimal quality of live for this people. Often is an assessment impossible the first time but with an introduction of the family doctor that was now often easy and could also discuss with the other professionals and the individual with dementia and his/her family. There we have the base and now we can start to change /adapt the environment (family and bed/toilet etc.) and introduced the treatment plane that can be done on an regular base. That must also be the case in all long living care situation , especially in Nursing home. ***Citation.*** *Jan van de Rakt , Steve McCarthy-Grunwald , Physical treatment of individuals with dementia. Part 1B. Assessment- WHY. Ita. J. Sports Reh. Po. 2021; 16;(8); 3; 1694 – 1730 ; DO 10.17385/ItaJSRP.21.16.080103 ; ISSN 2385-1988 [online] IBSN 007-111-19 - 55; CGI J OAJI 0,101). Published online.* ***Authorship credit*** *: "Criteria authorship scientific article" has been used "Equal Contribution" (EC)*




**Keywords;** *Dementia, Assessment, EDOMAH – Approach, What, How and Why- Assessment.*

## Introduction.

Part 1A ended with the How of the assessment scheme.
In this part we concentrated on the **WHY** and try to conclude and make an treatment program that must lead to an change. An change that we can measure as an progression and an sign that our treatment is worked. By older people is the progression never very great but by doing an good investigation there are so many possibilities to slow down the loss of function and that is the primary focus.

## Why : selectivity , active movement possibilities.

**Placing** ( selectivity - investigation )
With place you investigated the automatic adaptation of the attitude tone on the change of the movement/attitude. With little verbal instruction. From placing [2] go to **hold** position and describe the position that the person is able to take over and hold.
Or use the recovery stadia from Brunnstrom-Fugl-Meyer [1] for the arm, hand and leg .
Than when he hold the attitude is there still little movement to hold that movement on that place ( **Tuning** – describe how much)
Last test is : Can we **give resistance against the holding** position, that gives us an impression how high the coordination and the co-contraction is.

Be aware that there are in an early stage of the disease dementia an increase of tone as investigated in Belgium by Bieke van Deun and others [4]
The investigation is done in lying position and when here are no problems than try- if possible- in sit or stand position.
Mister A was investigated in lying position and there were some problems and that means that this will increase in sit – or standing position.

**Supine position:**

Head / Trunk



Placing the head means: Take the head but give no assistance and feel or the individual is capable to move with you without resistance. Than place the head in an position and ask to hold him there . When that is possible give resistance and feel the quality of that. Often the hold position is possible but with little movement before the stillness has reach , that we call tuning.
Mister A.: It was possible to place and hold without tuning but resistance in hold position was in end-flexion poor. Movement as lateroflexion and rotation were difficult but not impossible but both were limited.

Arm/hand (BFM Stadia = 6 Mister A ) **or placing, holding etc. technique**

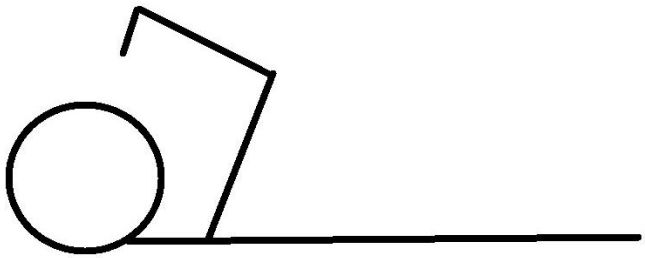


**Figure 1. Mister A**
This position we want to achieve. The way to this position (placing) no resistance and good following was there. No problem and no tuning by the next step – holding.
Light resistance was possible on the shoulder and more on the elbow and wrist /fingers.
*Figure 1 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Figure 1 Placing and holding arm.**

Leg (BFM Stadia = 3-4 )

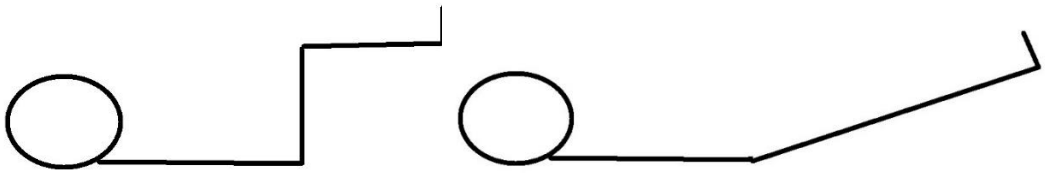


**Figure 2 - 3 Placing and holding position leg**

Mister A. : Placing of both legs (separately) was possible but with an slow movement speed otherwise there was an resistance. Hold was difficult par example 90 ° in the hip and mid stance ( no abduction ,adduction or rotation (endo or exo), 90° in the knee and 90° in the foot was not possible with losing in the hip, knee or foot something of the position ( figure 2). Hold with resistance was possible in the hip and knee but not so good in the foot. In the hip always was an deviation toward abduction with exorotation. Test this in sitting position or standing position is difficult or impossible but the other items we can do and we search of the selectivity changes through gravity !
The other placing test (figure 3) was even worse. The hip in 30 ° flexion and the knee in full extension with dorsal flexion of the foot.
Again was it possible to get to this position but there was some resistance when the movement was carry out fast and holding with knee in end extension and the foot in end dorsal flexion was very difficult. There was some tuning in the hip and resistance was not possible.
Be aware that the other leg must work also to give the position of the leg in the air stability. That makes the holding in figure 3 so difficult [5,6,7]
*Figure 2 and 3 (published with the responsibility and permission of the author by j.v.d.Rakt.)*



The position of the arm /leg are so chosen that there will be always an demand to move and hold out of the pathological synergy.
We know that paratonia is sign that selectivity is lesser and therefore are this movement and position important to investigated or there is an sign that the paratonia is present.
When the tone is increased than is the perception different and will the speed of the movement be lower than normal. Therefore we use movement and position in which always combination are used that are not possible for people with pathological synergy [8,9,10,12]

**Sit position:**
Head / Trunk

Mister A.: Placing of the head was almost equal with the lying position. The lateroflexion and the rotation to the left en right were difficult and there was an restriction both side with an light more restriction to the movements to the left. The movement from flexion to extension was restricted. He was unable to go in an “look straight ahead- position” and there was an lot of resistance .
Trunk upper, movement upper and sideways were good but also here an restriction to the left, Extension of the upper trunk was restricted , he was able to go to neutral but that was the end.
Trunk lower . flexion was good, extension restricted and lateroflexion to the left.

Restriction is in this part of the investigation the feeling of the therapist that he feels an restriction /resistance and that means that the nature of this must be investigated further one.

Arm/ hand (BFM Stadia = 6)

Mister A.; He was unable to placed his arm in the shoulder girdle further than an 130 ° and was able to hold that position with great effort but not with resistance. On the left side there was an little tuning on the end. The elbow and the hand en fingers were as good as in lying position.

**Standing position:**

Head / Trunk ( Upper)

Mister A.: Almost equal as in the sitting position. It feels all what more difficult, an sign that the tone is increased in this standing position .

Arm/ hand (BFM Stadia) **6**



Tips :

- Head placing ( pure latero flexion of the head is difficult than rotation and compare left with the right possibilities)

Mister A.: Hand stay in BFM 6 , shoulder now not higher than 100°. The resistance against the movement in the shoulder was higher and we decreased the speed of the placing movement and that makes some difference.
But the standing position gave him an lot of problems with his balance therefore we cannot say that the tone was pathological but an increasing because the support place is getting smaller.

Placing ( move to an position),
Holding ( keep the position)
Holding against resistance and
More movement in holding the position (tuning)

This gives an picture about tone, selectivity ( placing and holding in different position in different joint all out of an synergy, but also about power and coordination.
Only the difference between them isn't clear yet.

**Why – Tone passive .**

**Amount of resistance.** Passive movement of the whole range of the joint and not the end position determinates the outcome but the movement between. Be aware that extension of the head will mean, that the resistance is felt through an increase tone of the flexor muscle of the neck. And that counts for all movement and their muscles !!!!
(Investigation done in supine position or it will be described.

**Mass-P : Modified Ashworth Scale[12] for paratonia. (Waardenburg 1999 [13]) Mass-P**
**0 = neither resistance nor assistance to passive movement**
**1 = Slight resistance during passive movement**
**2 = More marked resistance to passive movement**
**3 = considerable resistance to passive movement**
**4 = severe resistance to passive movement, passive movement is impossible.**

| *Mister A.* | Movement | Resistance | | Movement | Resistance |
|---|---|---|---|---|---|
| Head | Flexion | 1-2 | Elbow | Flexion | L 0 R 0 |
| | Extension | 0 | | Extension | 1 1 |
| | Laterofl.left | 2 | | Supination | 0 0 |
| | Laterofl.right | 1 | | Pronation | 1 1 |
| | Rotation left | 2 | Wrist | Ulnair deviation | 0 0 |
| | Rotation right | 1 | | Radial deviation | 0 0 |
| Trunk Sit | | | | Dorsaal flexion | 0 0 |
| Upper | Flexion | 1-2 | | Palmair flexion | 0 0 |
| | Extension | 1 | Fingers | Flexion | 0 0 |
| Whole trunk | Rotation left | 1 | | Extension | 1 1 |
| Whole trunk | Rotation right | 1 | Thumb | Extension | 0 0 |
| Lower | Flexion | 1 | | Flexion | 0 0 |
| | Extension | 0 | | Opposition | 0 0 |
| Whole trunk | Laterofl. left | 1 | | Abduction | 0 0 |
| Whole trunk | Latero fl. right | 1 | | Adduction | 0 0 |
| Arm | | | Hip | Flexion | 0 0 |
| Shoulder blade in side lying | Elevation | Left Right | | Extension | 1 -2 1-2 |
| | Depression | 1 1 | | Abduction | 1-2 1-2 |
| | Latero rot. | 1-2 1-2 | | Adduction | 0 0 |
| | Media rot. | 0 0 | | Endorotation | 1 1 |
| | Adduction | 1 1 | | Exorotation | 0 0 |
| | Abduction | 2 2 | Knee | Flexion | 0 0 |
| Shoulder | Anteflexion | 0 0 | | Extension | 1 1 |
| | Retroflexion | 0 0 | Ankle | Dorsal flexion | 2 2 |
| | Abduction | 0 0 | | Plantair flexion | 0 0 |
| | Adduction | 0 0 | | Inversion | 0 0 |
| | Exorotation | 0 0 | | Eversion | 1 1 |
| | Endorotation | 0 0 | Toe | Flexion | 0 0 |
| | | | | Extension | 2 2 |

**Table 1**

Disturbances of tone by people with dementia occur much sooner than often taught. That makes the treatment different and especially the balance treatment. Latest publication [27] gives an picture that also the fine motor function in the arm are be decreasing and gives an confirmation about the balance, walking aspect [19].

## Why- resistance –restriction investigation

Which form of resistance there is by the passive movement?

1.Stiffness. = decrease of viscose –elastic in the tissues [8] ( not neural changes of the nerves)

Mister A.: Stiffness at the end of the joint in the neck towards extension, lateroflexion /rotation particular to the left side . Also in the upper and lower trunk and in his shoulders was at the end of the joint movement stiffness.

2.Contractures of the muscles, that means that the muscle inhibit the movement (Not – nerve or neural structures) or is the joint the inhibit factor. Difference between tone and muscle is to obtain by increase the speed of the movement and compared with slow and never at the end of

> Mister A.: There were no inhibition by muscle shortening through tone or sarcomeres loss. Maybe what signs in the movement of the scapula to the front and maybe some signs in the calf muscle but that can also the nerve. In the neck, spine thoracic and lumbar and both the shoulders there were restriction through the joint mobility ( Hypotheses )

the mobility of the joint. An joint restriction will felt as an block and will be hard.

1700

3. **Rigidity** (= Lead pipe phenome)
Is there an rigidity to feel - **no**

4. **Paratonia** , Tone is high in agonist and antagonist.
Is there paratonia [13] - **Yes** in the leg.

> Mister A.: Head ? , upper and lower trunk , scapula and legs (?) because the tone of the agonist was zero. Testing with an higher speed give in the legs more resistance but that wasn't possible to do this with the head.

5. **Hypotonic** = flaccid = muscle tone to low—**no.**

6. **Changing tone** (ataxia, chorea, athetosis ) - **no**

7. **Hypertonia** = **no** (Jackknife phenome[8,15)

Resistance against passive elongation of the muscle:--- **no**

Test en observe during the tasks, achievements and situations on:

Clonus --
Hyperreflexie: ----
Association reactions: ---
Tonic (static) reaction – activity :
Have you see ; Local reactions
Segmental reactions
Total reaction

> **Local reactions : Mister A.: Positive stretch reaction [8,16],** Touching the ball of the hallux give extension in the leg. Not every time but often , too often !

**Explanation;**
This part of the WHY is difficult because we are looking for an neurological tone. But there can be also an hypertonia that isn't always neurological.
First we had investigated the **stiffness**, that is normal on the end of an joint movement but it can be disturbed by an high tone because that changes often the elongation of an muscle without that the muscle is really shortening (loss of sarcomeres) but also orthopedic changes can influence this stiffness. Joint mobility can be loss or changes by disease in the joint or old intra articular fracture of other damage, but this mobility can also be changes by not properly functioning of the articular joint and then can be an treatment with translation [17] be important
**Contractures.** Working in an Nursing home all people seem to have contractures, but often this is hypertonia. But very difficult to treat. The Foetal attitude]18,19] is most prominent example, but often this attitude that seem to have only contractures is an "creation" trough tone and is to change but very difficult and never complete.

One of the most amazing changes in tone and contractures is when an individual with an Foetal attitude get high fever, than often the tone decrease rapidly and also the contractures but when the fever is gone, the tone is coming back and also the contractures.
The same we see under narcosis or by an great epileptic insult.
Here we seek the “contractures” through muscle tone, an muscle tone that is change through damage of the brain. There is also an reaction on pain par example when the nerve tissue is hurt ( defensé muscular) and that isn’t an tone trough brain damage and should therefore be different [20].
We know through the work of Tardieu[14] that muscle that stand in an shortening position for more than 12 hours adapt itself and then the muscle is shorten and the mobility of the joint is less. This is an reversible damage but very difficult to restore, because the agonist is shortening but the antagonist is than in an elongation qua number of sarcomeres ( see figure 4)
The only not reversible contractures is, when the joint is so damage that there is an process of ankylose than this joint isn’t moving anymore and we see there muscle atrophy.



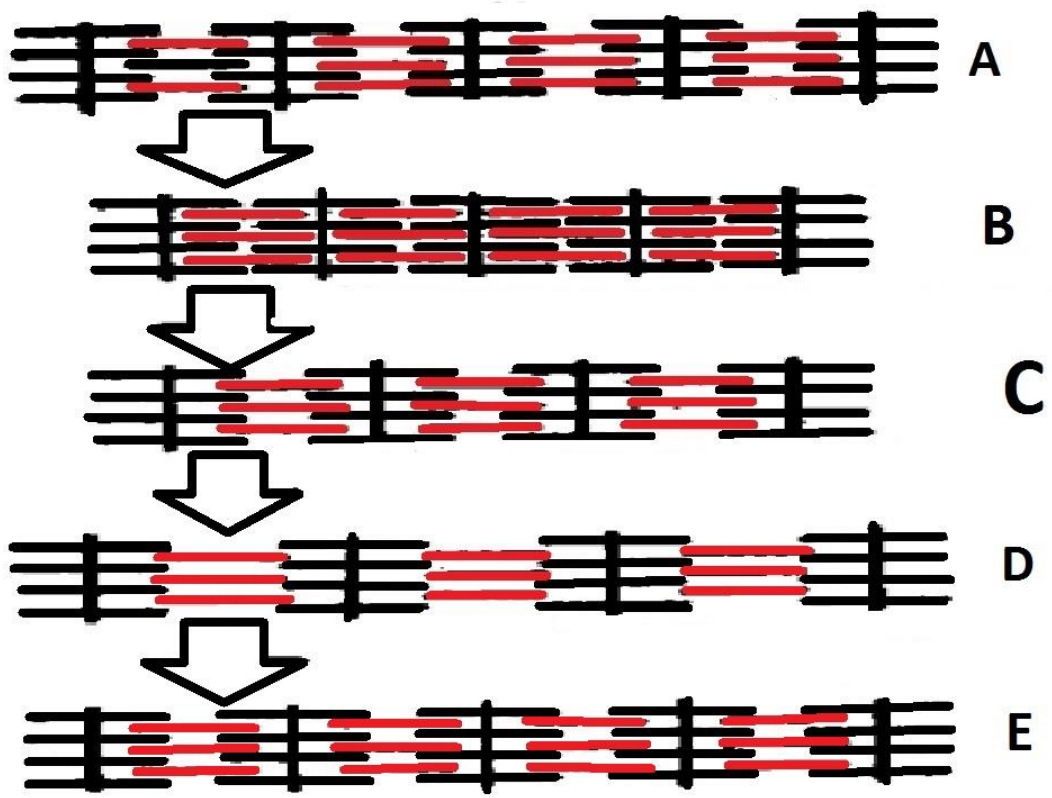



**Figure 4 Sarcomeres.**

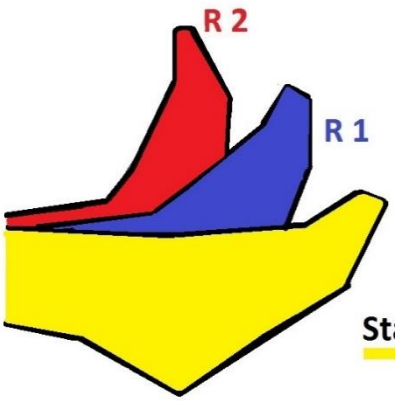
**Figure 4.**
A = the normal stand of the actine and myosin chains in an muscle. This muscle stand in an position that muscle likes. Not in an contraction or elongation stand.
In the lab. Tardieu[14] and his group placed this muscle under electric current and that give the situation as in B.
B= is an active action of an striated muscle as by an contraction. When this contraction hold on for more than 12 hours the muscle adapt himself by losing an sarcomere.
C= is this adaptation , now there are only 3 sarcomeres left instead of 4.
D = elongation of this muscle or the antagonist and then the adaptation is creating an sarcomere more , therefore again 4 - E.
*Figure 4 published with the responsibility and permission of the author by j.v.d.Rakt.*



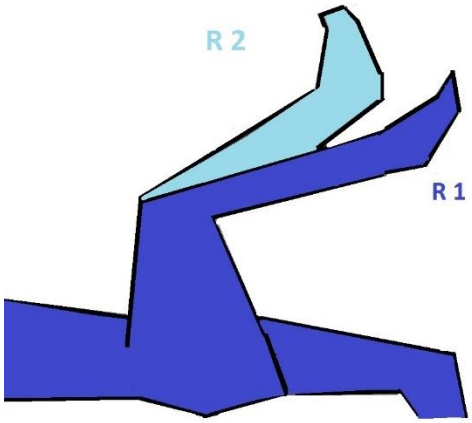
This elongation will also occur in the antagonist and makes the control less over the joint. An muscle that is shortening can be treated by elongation of minimal 12 hours and will than adapt with restoring the number of sarcomeres but the quality of the muscle decrease with 25% [21]. Elongation to restore the number of sarcomeres must be hold about 12 hours but also continue contraction.
The limit -12 hours- is still today the outcome of the investigation of Tardieu and his group[14] and nobody knows, of this 12 hours are necessary.
Treatment is possible with plaster casting but often is when the plaster is dry the tone so much decreased that the “contractures” is gone and then there is no sarcomeres loss but only an increased tone that responded perfect on plaster casting[21]
An striker foot [23], that we see by many neurological diseases is often treatable by giving an resistance against the foot ( or even against the ball of the hallux) and when the individual try to push this away give this an movement in the foot and an change in tone.
Rigide/ Paratonia and hypertonia are all signs of brain damage but the tone is different.
Rigide has an resistance that feels like an Lead pipe or cogwheel and is typical for Parkinson diseases.
Paratonia [19] is the tone disturbances that is describe by the dementia of Alzheimer and one of the characteristics is the tone increase in agonist and antagonist.
In this case there where in some joint positive signs but in other joint not. We therefore have increase the speed of the movement because all neurological disease will give an increase of tone when the speed is increased. And then the tone of the antagonist seem to be higher and that can confirm the possibility of paratonia.
Hypertonia or spasm is comment by individual with stroke and in the early phase of the disease we feel than an suddenly increase of tone that suddenly vanish. The Jackknife phenome [8]!
When individual after stroke has longer an disturbed tone than will this phenome changes and look likes Parkinson or Paratonia and by people with vascular dementia is it possible that all kinds of tone-increase occur.
Then there are other tone disturbances as Ataxia, hypertonia, athetosis and chorea and that are all forms of neurological tone disturbances.
When the tone increase through an reaction of the damaged brain, than will be there is an loss of selectivity.
When the tone increase is an defensé Muscular than the mobility is less but not the selectivity[16,20].
Someone with back pain has an loss of mobility, but not of selectivity, he created his attitude because he has selectivity to try find an painless attitude.
That can an individual with an brain damage and through that an loss of selectivity **not**.
Of course there are always border cases and then is increasing of speed an good assessment to see what the nature of the tone increase is.
Asworth[12] has developed the Asworth scale, on which the scale (MAS -P) of Waardenburg and others[13] is build.
The speed of execution is only valid for the movement of the knee and elbow[12]. Other joint we must remember the speed that we use and adapt this on the joint that we go to investigated.

Than all joint are investigated with the same almost normal speed.
Knee and elbow is the speed in which someone can say an number with 4 ciphers[12].
**Par example 1996 !!**
Differentiation is possible by using more speed than the speed that Mass-P use. When with that speed the tone is normal than we can use an higher speed. An muscle that has not suffer through neurological damage will not increase his tone but an muscle that has suffer from neurological damage, will do that well. So we can use the Mass-P speed and an higher speed and feel or the tone increased ( Tardieu[14] investigation of tone ). In this investigation we use it when it was not clear or the tone in the antagonist was also increase. And when we the speed increase it was the case, only this was not possible in the head .






Start position




**Picture 1 Tone assessment Foot.** **Picture 2 Tone assessment knee.**

**Picture 1 and 2.**
R2 is the tone investigation with the Mass-P [13]speed and R1 is an higher speed according Tardieu[14]. There is an clear difference between this two measurements. The fast speed (R1) is restricted by an high tone in the calf muscle ( Picture 1) and the knee flexor in picture 2. The slower movement (R2) go further and now we sure that the restriction is trough tone increasing.
*Picture 1 and 2 published with the responsibility and permission of the author by j.v.d.Rakt.*

Clonus /Hyperreflexie/ Association reactions Tonic (static) reaction – activity : -Local reactions- Segmental reactions- Total reaction[8,9,16,24]: This are all siogns that there is an neurological ( brain ) damage.

Why - Sensory / perception.
What "feels" the brain of this individual ? Is very difficult but also use the items discussed in the article , par example bed attitude**.**

**Position of the body lying on the bench or in bed [25] ?**

| | | |
|---|---|---|
| **0** | **=** | **Feeling is good** |
| **1** | **=** | **Minor disturbances** |
| **2** | **=** | **Moderate disturbances** |
| **3** | **=** | **Severe disturbances** |

In this case the test were almost everyone possible on the usual way, but not on one day because his attention was short.
The two ( discrimination sense and gnostic sense) were clear. But by the gnostic, we must use another approach. He didn't look to his foot when the tuning fork touch his bone by the hallux and also no reaction was there when we touch the malleolus medialis. Therefore we didn't know or he feel something. Try to push the towel away to look better is an sign, that the stimulus is enter the brain. Regrettable it gives not direct the amount of the stimulus, but that must we learn by doing it often by looking to the behavior and tone of the individual with dementia. How more that changes the more

this individual has feel the stimulus. With the tuning fork we do first the test on jaw joint and then on the foot(hallux) ankle or under leg always against bone structures.

**Test of the sense and perception.:** ***Mister A.***

| | Surface Sense | Tuning Fork 125/64hrz. | | | | Sense in muscle and joint. Movement sense (Depth sense / Proprioception) | |
|---|---|---|---|---|---|---|---|
| | Pain Temp. Pressure | Gnostic Sens. | Extinction | Fine sense and 2-points-discr. | | Body position and Control movement | Mirroring |
| Head | 0 | 0 | 0 | 0 | | 0 | - |
| Trunk | 0-1 ? | 1 | 1 | 0? | | - | - |
| Arm | 0 | 0 | 1 | 0 | | 0 | 0 |
| Hand | 0-1 ? | 1 | 2 | 1 | | 1 ? | 1 ? |
| Leg | 1 | 1 | 2 | 1 | | 2 | 2 |
| Foot | 2 | 3 | 3 | 3 | | 2-3 | 2-3 |

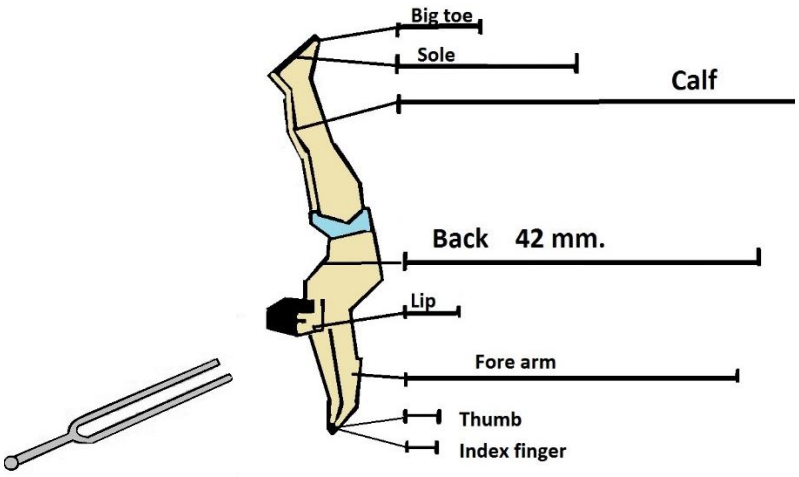
**Table 2**

**Allow no vision, when the patient every time try to look , is that an signal!!**

-Vision; ( input?) -hearing; (input ?) -Taste ; (input ? ) - Smell: (input? )

Be sure that there are no problems with the function of the eyes. A lot of people with dementia have problems with the eyes and that makes things complicated. This individual has eye problems and visual capacity was less. Therefore is the place ( Photo 4) where he is walking very difficult for him because the floor is dark and looks slippery. He will walk better on an floor that is light and not shining and with an clear mark where the floor stops and the wall start, where the door start and where the support is in the corridor or somewhere else.

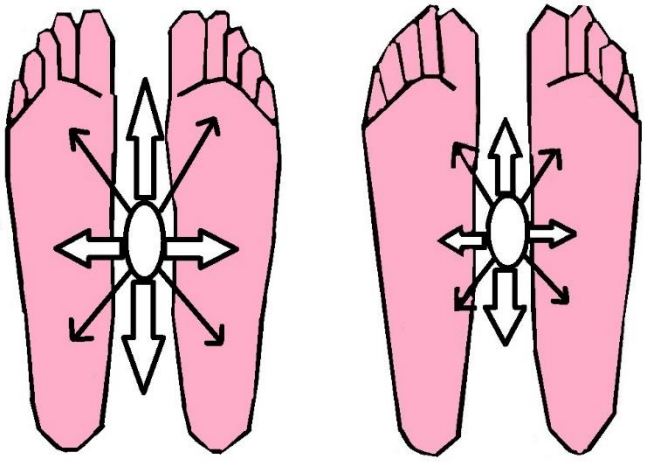
His hearing was less and his taste was not assault by polyneuropathy diseases. His smell was good.




**Picture 3 and 4.**
The tuning fork and the distance normal between two point on your body. The foot was disturbed and the sole has the distance of 35mm normal but in this case he felt two point as one point. One on his ankle and the other at his toe.
*Picture 3 and 4 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Picture 3 and 4**

That means that he feel no movement under his feet and he recognized not what the quality is of the floor and will therefore not lift his feet because he think that it is slippery. And stay unable to feel that and "prove" that it is safe!
When the distance between the two point is so large than we see often that the toe will claw and make so an second point. He will placed therefore his foot in his whole on the floor. This great difference in two point feeling means that he feel no points in the medial-lateral direction and that makes balance control to the side / lateral very difficult.



**Picture 5.**
On the left the normal swing in an standing position of an younger one and on the right side the swing of older people [. The difference is that older people stay more at the centre and one of the reason they do so, is, there is no good perception of the lateral disturbances in the brain because the two point discrimination sense isn't optimal anymore !
*Picture 5 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Picture 5.**

Look when you are testing or the joint has an different form because pain is by people with dementia not gone but this people react differently. And joint or other signs as colour give us an hint that there can be something not functioning so well. Par example : The Metatarsal joint 1 75% of this people suffer from an form of arthritis ( Gout)
Mirroring and movement sense is very difficult to test and often impossible but there are marks that there is an disturbances and often more in the legs than in the arms. In this case it was possible but we were only sure when we ask him several times to bend his leg in lying position always was the same: the hip started and the feet came after the movement of the knee. Normal is that that all joint start on the same moment.

**Photo 1**
The lifting of his leg start in the hip and the foot is still in plantair flexion. This we see often by older people, but by older people with dementia even more. This certainly an sign of loss of perception in the foot.
Of course it can also be an sign of less muscle strength in the foot. Both can lead to an too late lift of the foot by seeing an obstacle and cause an stumble.
Look also to his attitude of the knee and especially the hip – to much flexion and exorotation - . *Photo 1 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Photo 5 Bending the leg with an late reaction of the foot.**
**Mirroring:** We place an arm ( passive) in an particular position and without looking we ask him to place the other one in the same position ( deviation of more than 11° in the great joint and more than 4-5° in the small joint) give us an sign that this disturbed. No contact or movement in the arm is allow.
**Movement sense;** is the same but now we move the arm or leg and ask him or he felt that and where that arm/leg stand and try to copy. And without looking do the finger –finger , the finger nose and the heel –knee proof.
The tone is higher in the legs and that the selectivity is less there and that the perception isn't optimal.
This is an connection that always is there when there is an brain damage[16] !!
Tone increasing with an decreasing perception!!

The results of the Mirroring and movement sense test are;
They are different and then it is important to look what he do and particular what he must correct with his eyes. Because that is an sign that the feeling isn't optimal and he must correct it with vision and that gives us an hint how much perception the brain receive and that can explain why he react in this way: This loss of perception explain why he walks with his head down to see the floor!

Testing the perception is not so easy often as in this case. Therefore is it important that we assess so early as possible because than it is easier to follow the decrease of the system.
But often the test are not to do because the individual don't understand or cannot cooperated and then we pay attention what is changing when the eyes are not used.

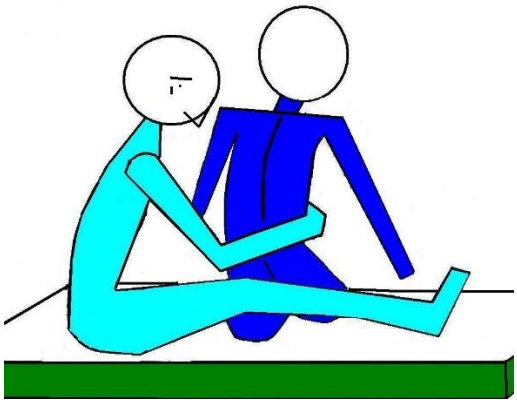
- The bending of the leg starting in the hip and not in the foot is such an example.
- Sitting on the edge of an bench or bed with the feet free, must be follow with an movement of the legs often in symmetrical or alternated way. The movement is equal left and right. When this isn't the case than is often in the leg that is slower the perception lesser.
- Legs build an closed chain and feel the tone. Legs that never created an closed chain are "vanished" out of the brain and need input to get an good connection. We see this often in the morning when the individual is lying on his back and need than input and that is often an disturbed sensation. Against each other is normal, but not continue and certainly not with an high tone.
- Try an test under the table. Clapping in the hand, try to find back the hand of the therapist. Give something in the hand and try to guess what it is, par example an coin.
- What are the hands doing through the day. Are they continue buzzy with each other or with other things and how is the tone.

- Walking with no lifting of the feet. Shuffle and investigated of the toe are clawing !!

**Why – balance test in sitting position.**

-- Test from the lower trunk in sitting position, can give clearness of the possibilities of the trunk to participated in the "ankle "strategy of the balance[28].
-- Side way in standing position asked first an reaction of the trunk, later on in the ankle.
-- Balance reaction in sitting position . Not created this by asking to reach as far as possible but sit along the person , make him to cross his legs and let him search to create on this small support plane his balance. The active exorotation in the support lower trunk/hip is very important.





**Picture 6**

**Picture 6.**
Sitting along the individual with one leg behind the individual, we invite the individual to lean against the therapist and build than an active sitting posture and an balance reaction in this position. Be aware that there must be an reaction in the lower trunk/hip first and that must be an active exorotation.
Going to one side is an action of the other leg –pushing with the other leg and that is normal.
When that other leg is crossing than we see the active exo on his top level and that is what we want to see.
*Picture 6 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Balance reactions**

**Sit - Sideway Mister A.**

| | | |
|---|---|---|
| To the left | Head | First to the right than to the left. |
| | Trunk | Upper trunk sideway to the left |
| | Trunk start | Start with an lower trunk but cannot hold this |
| | Left arm | Start correct but through the upper trunk goes in retroflexion |
| | Right arm | Is searching but he hold the arm free in the air |
| | Left leg | Very difficult to get it crossing over the other leg and then more upper trunk sideway |
| | Right leg | Exorotation isn't active only an little movement |
| To the right | Head | The same as to the left but then reversed |
| | Trunk | The same as to the left but then reversed |
| | Trunk start | The same as to the left but then reversed |
| | Left arm | The same as to the left but then reversed |
| | Right arm | The same as to the left but then reversed |
| | Left leg | The same as to the left but then reversed |
| | Right leg | Exorotation isn't active only an little movement, but more than on the other side |

**Table 3**

Sit – front ---- wasn't possible to dangerous , he found!!
Sit – Back --- was no balance reaction, he was lying down.
Be aware that individual with dementia will react- often angry - when she fail !

Why balance reaction first in sitting position ?

In standing position is often very confronting and we cannot good assess what the lower trunk/ hip do in standing position. Further we know now something of the perception skill in balance situation in sit, before we go to test this balance reactions in standing position. The reaction of this gentlemen to the front and back give us information that the support area is very important and that we must be careful in the standing position. The movement to the side are very poor in the lower trunk and hip – of course the hip isn't in the right position, an hip position with 90 °flexion -, but gives us the information that sideways balance reaction are very poor and that we must be careful by the test in standing position and with one leg standing !!

Why - Balance stand!



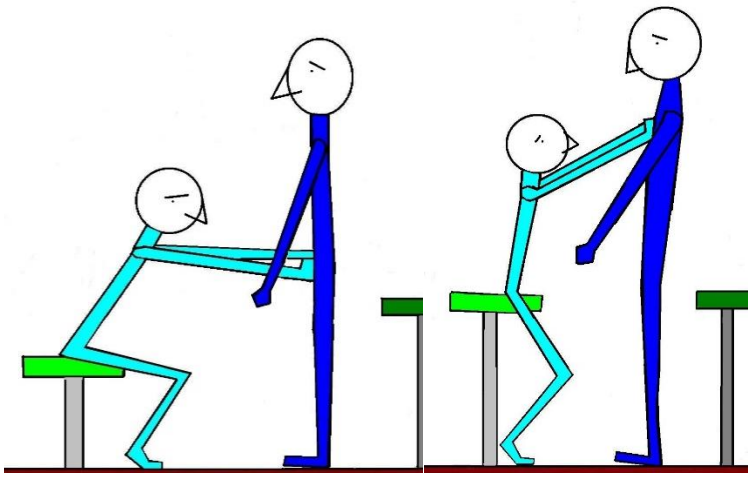
This we do by the statiek- technique [29,30]. Than we create an safe surrounding for the individual and we can feel what he has to react on an disturbances on hip and shoulder level.
Balance reactions of older people are different than by younger people. Move and fall [31]gave an impression why people fall and one of the points was that the movement of the trunk is often too late and inadequate.
The theory that we have an ankle strategy, an hip strategy[32] and an step strategy is differentiation for young people, but not for older people and certainly not for people with dementia and loss of the "cortex".
By older people all must work together to create an adequate balance reaction. An deficit in the hip of the foot is enough to make an adequate reaction very difficult and can lead to fear for falling and/or avoiding movement. Testing with resistance teach us how much power there is and of this power is enough to make an good balance reaction .
The ankle and the hip/trunk must act together and the purpose is to brace the "falling "movement. That is very important because the weight must be complete on one leg, otherwise there isn't an good step strategy possible. That weight shifting is the most important task of the bracing effort and that must be done by the ankle/hip strategy. Older people and especially with an neurological disease must combined the ankle and hip strategy together to create that bracing system and often is in both system an failure what makes that the bracing system is too little or/and too late.
To little when the power ( strength × speed) in the body from foot till head isn't strong enough!
To late when the perception isn't at the right moment in the brain to activated the bracing system. This senso -motoric track seems especially by older with an neurological disease be ripped and the cause isn't clear but some pointing to wrong methods of standing up or/and helping by the standing up procedure [33].
This conclusion was possible, because the fall was register on an camera. And his conclusion was the most of the people fall because the weight shifting wasn't correct.
Looking at this video's it was visible that the braking reaction was too late and therefore not enough to get an good weight shifting and an proper step strategy.
Furthermore the trunk movement ( part of the hip strategy) wasn't correct especially when people fall to the back or sideways.
Falling back ask for an trunk movement to the front as part of the bracing strategy but also because the leg that is free goes than automatic to the back. Falling sideway ask for an elongation of the trunk to get room for the free leg to cross the standing leg. Trunk shortening on that side gives and abduction and make crossing impossible.

Photo 2

Photo 3

**Photo 2 and 3.**
Photo 2 Drawing an line from the heel up that it is obvious that there is more body behind the line than in front and especially the upper trunk is too far to the back. But the strategy of the ankle and the hip are not reacting !! The system react to late , why? In the brain isn't no perception of danger? This is an example of 'Wrong weight shifting "[33]
Photo 3 show the reaction in the feet but not in the trunk. The bracing system is too little, there is no possibility to place one foot far back, also because the trunk makes the wrong movement and that stimulated the "free" foot to go to the front. Not –"Free" because the feet are never free and carry weight and that makes an great step impossible
*Photo 2,3 with permission of the group around Prof. Robinovitch granted to j.v.d.Rakt. (published with the responsibility and permission of the author by j.v.d.Rakt.*

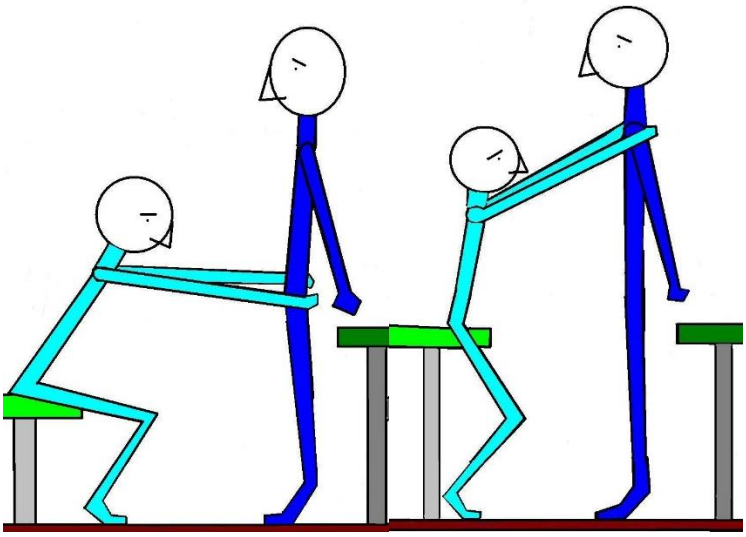
**Static test [6,29] How to assess this balance reactions :**



Picture 7

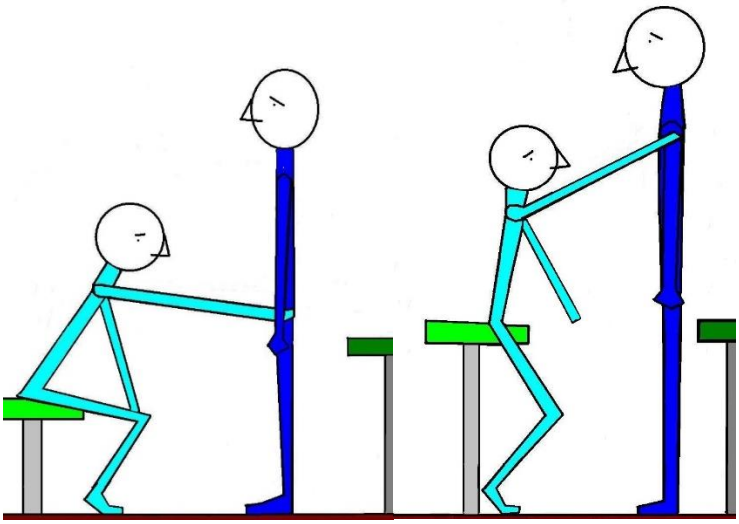
Picture 8

**Picture 7 and 8.**
Statiek technique to investigated the balance reactions.
The braking possibilities of the combined ankle - and hip strategy.
But also give this an picture of the perception of the body when the reaction take place after an little pressure on hip and shoulder level.
Even the weakest part in the chain can be found.
Picture 7 and 8 (published with the responsibility and permission of the author by j.v.d.Rakt.



Picture 9 Picture 10

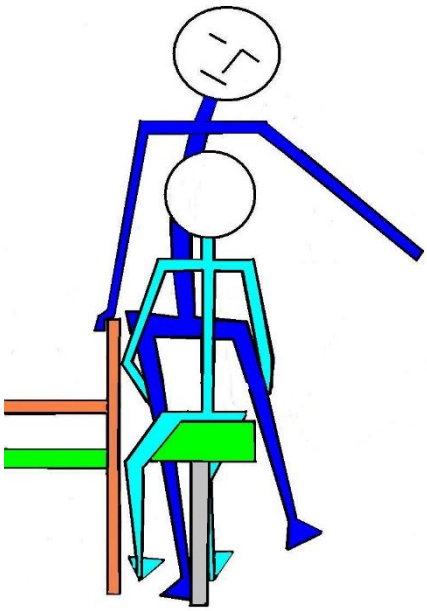
**Picture 9 and 10.**
Statiek technique but now pulling to the front on hip level and on shoulder level.
This is the test that test the back diagonals and often in this muscle pattern is the weakest point the buttock. That means that this people often walk in an flex attitude and means that falling to the front gives not enough bracing and the free leg will go to the back instead of to the front.
*Picture 9 and 10 (published with the responsibility and permission of the author by j.v.d.Rakt.*



Picture 11 Picture 12

**Picture 11 and 12.**
Static technique on hip and shoulder level on the homolateral structures
( keypoint).
The reaction must be immediately in the side where the pressure is given. When this is done with the other leg than is that an sign that the keypoint are not so strong anymore. With one arm because the other hand will feel as support.
*Picture 11 and 12 published with the responsibility and permission of the author by j.v.d.Rakt.*

When the individual isn't able to give the pressure at right moment in the leg on which the pressure is given than do the one leg standing test. But be aware that this test give also information over the perception.
Test of the power of the homolateral structure (keypoint) can be done through resistance against the leg, that is of the ground and see of the pelvis isn't drop down ( co-contraction).
**Perception test** on leg standing : Place the individual with the hip along the edge of an table but with an distance that is necessary to lift the other leg with an lower trunk. Then ask of the individual try to touch the edge of the table ( an movement that is necessary to lift the other leg with an stable pelvis). An individual that wasn't able to give resistance on the pressure sideway, will have fear to go so far with the lower trunk sideway.



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Picture 13

**Picture 13.**
Investigated or the individual dare to move with his hip lateral and with hip moves over the foot.
Often the individual will stop early and make an upper trunk sideway to lift his leg. That means that the perception is change and that moving over the support area of the foot isn't feel right. Normal we move over the foot support area to get our other foot free and swing that foot to the front ( Normal walking)
An lot of older and especially older with dementia have this loss of perception ( or walking with an rollator frame that also change the perception) and that will have an reaction in the muscle . When the muscle of the keypoint are not use, they will decrease in power ( atrophy). Therefore the combination; loss of perception and loss of power makes the balance sideway very vulnerable !
*Picture 13 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Static test – where attend to.**
Start in save surrounding. (Pictures 7-13) the individual stand with behind him an bench). Also there is an competition element, what is important by people with dementia. But be aware that they do not fail, they win and we assess!!
Look to the standing position and place your fingers in an corner of 90° in the MCP joints. This make it impossible for the individual to get an "support" through the hand of the investigator.

1. Little pressure at hip height and feel of there is an immediately reaction and how much, according the pressure you give. This pressure is so low that balance reactions are not necessary but how react the individual with too little reaction, too much or good. To little can be too slow perception or/and to little power , too much is an sign that the individual is not aware that this is too much and he can fall to the front.
2. Again but try not to touch the individual at once, normally he will react before you touch because he knows what is coming . Important he has learn !!
3. With little pressure 3 times and feel or the is an difference between left and right.
4. Now increase the pressure and look to the feet and observe the trunk/hip. The reaction of the trunk/hip and feet must be equal in the front –back test and the trunk /hip is early in the side way test.
5. Do this an few times and search for differences between left and right.
6. Make the pressure so high to investigated where the border is and let the pressure suddenly loss and observe the reaction. Is there still an good brace and weight shift and an good step to the front/back etc. This is an dangerous moment and only possible when there is enough power in the body of the individual[33].
7. Extra test to assess the power in the chain. When the pressure or pull is done on shoulder level than we often feel that the reaction is decreased and that there is an flexion in the hip ( by pulling to the front) and then is important to investigated by which degree of flexion in the hip the reaction take place and how powerful he is. For the dorsal flexor- muscles, we can placed our feet on the feet of the individual ( when we have that strength comparing with the individual ) and then is normally someone capable to "hang "his body on his feet. The power of the calf muscle must be so great that someone on one leg is capable to lift his whole body

on this toe and that 10 times. But give him support because it is no balance action but an search for power and by giving support you feel how much support he needed.
Important !! Pressure on the front ask for an dorsal flexion and trunk hip flexion together on the same moment! Pressure from the back ask for plantair flexion and extension trunk /hip together on the same moment Pressure sideway ask for an elongation and reaction on that side with the lower trunk goes to lateral on the pressure side and after that an reaction in the foot , goes in inversion.
Trunk movement to the front on one leg give an movement of the other free leg to the back!
Trunk movement to the back on one leg gives an movement of the other free leg to the front!
Trunk movement to the side must give an elongation on that side in the trunk than will cross the free leg to the front, when there is an shortening than goes the free leg in abduction!
And when the selectivity is poor this reaction will occur faster and inhibition is very difficult !!



**Balance reaction in standing position ( test by static technique) [6]**
Resistance on hip – and shoulder height. Case investigation of mister A.

**Forward therefore an pull on hip – shoulder height *Mister A.:***

| | |
|---|---|
| Reaction of the left foot. | Little lift of the heel at both levels. Power to little. |
| Reaction of the right foot. | Little lift of the heel at both levels. Power to little. |
| Reaction lower trunk left. | Inclination of more than 20 ° before resistance |
| Reaction lower trunk right. | Inclination of more than 20 ° before resistance |
| Step right | On the forefoot and very little, no total weight shift |
| Step left | On the forefoot and very little, no total weight shift |

**Table 4**

**Backward therefore push on hip- shoulder height. *Mister A.:***

| | |
|---|---|
| Reaction of the left foot. | Only reaction in the toe and fore foot , not total dorsal flexion and power to little |
| Reaction of the right foot. | Only reaction in the toe and fore foot , not total dorsal flexion and power to little |
| Reaction lower trunk left. | Not immediately reaction on the pressure and on shoulder level the trunk is always too late |
| Reaction lower trunk right. | Not immediately reaction on the pressure and on shoulder level the trunk is always too late, right less comparing with left. |
| Step right | Small step back and no good weight shift. |
| Step left. | Small step back and no good weight shift. |

**Table 5**

**Side way left . Pressure left , and pay attention that he stay on left leg. *Mister A.:***

| | |
|---|---|
| Reaction of the left foot. | No reaction |
| Reaction of the right foot. | No reaction |
| Reaction lower trunk left. | Isn't capable to build here the pressure but do it from the other leg. |
| Reaction lower trunk right. | Push to resist the pressure left |
| Step right | No step possible here is the weight |
| Step left | No step. |

**Table 6**

**Side way right . Pressure right and pay attention that he stay on the right leg. *Mister A.:***

| | |
|---|---|
| Reaction of the left foot. | No reaction |
| Reaction of the right foot. | No reaction |
| Reaction lower trunk left. | Push to resist the pressure left |
| Reaction lower trunk right. | Isn't capable to build here the pressure but do it from the other leg. |
| Step right | No step. |
| Step left. | No step possible here is the weight |

**Table 7**



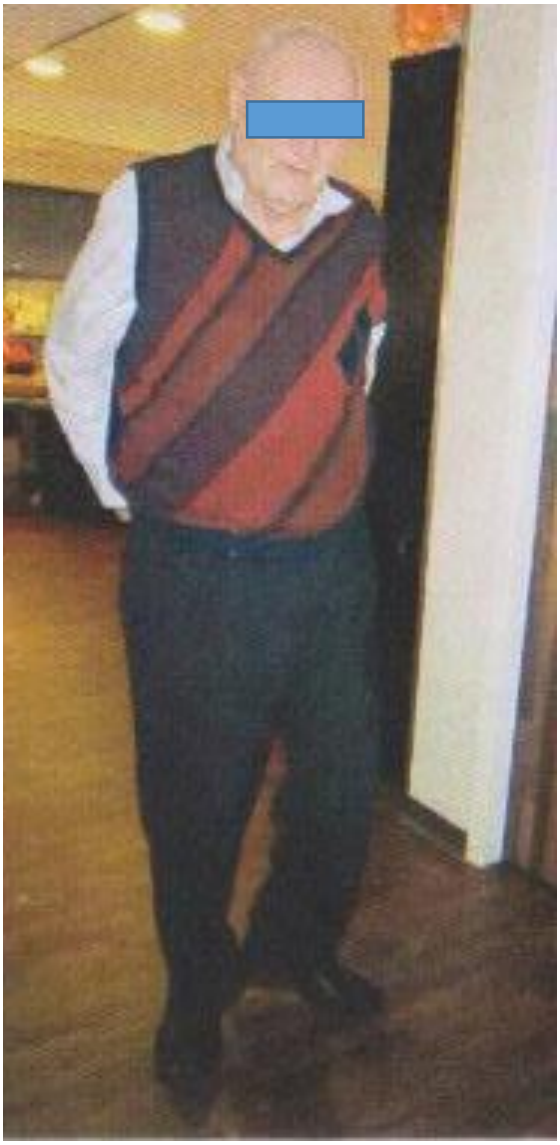

**Photo 4**

**Photo 4 . *Mister A.***
When we see him walking with his hands on his back , it seems that he has an good balance. But we have investigated that his perception in the feet is bad and we see now that the reactions on the static test is also bad. The reactions of the feet ( ankle strategy) are too late and too little and the power, he has, is too low.
He is not capable to build immediately the right pressure in all directions and the worse is the pull forward on shoulder level than there is 20 ° almost no reaction.
Side way; he cannot build up an pressure out the leg his is standing up and that means that his one leg standing is thin. He can do it with an upper trunk side way and no pelvis that stay on the horizontal line.

*One leg perception:*
The test lower trunk moving to the edge of an table over the foot support area, he was afraid that he will fall before the hip was reaching the edge, both sides.

*One leg standing*
Standing on one leg was possible for 10 sec with eyes open with an upper trunk sideway.

*Photo 4 published with the responsibility and permission of the author by j.v.d.Rakt.*

## Why - Assessment of the diagonals [6].

In supine position: Look not only to the trunk, but also the shoulders, hands, legs and foot on the right and the left side.

**Photo 5.**
The test to investigated the power of the front and at the same time the power of the other back diagonal. To lift his left leg with an sand back, he require an stability in his body. That will be done by the back diagonal from the left shoulder to the right leg and in this case the arms are on the stomach. He must therefore correct the rotation caused by the lift of the left leg by exorotation of the right leg. That will be happen in the hip and is an major function of the gluteal muscles. Normal we press our heel in the bench and rotated the hip into exorotation and that will be done **without increasing** of the tone in the calf muscles. Resistance on the left leg will therefore also give evidence of how much power the back diagonal can bring and we have an R. M. Repetition Maximum. And we feel how good the front diagonal performed.
*Photo 5 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Photo 5**

**Diagonal test of the legs all a way to an the tentacle test.**
Pre -test of the tone of the stomach. ;
Go with the tip of your fingers under the ribcage[16]. Be sure that the head is on the pillow. Try to go so far as possible. Then ask the individual to lift his head or make him laugh. Then feel how fast your fingers are removed under the ribcage and feel of there is an difference between left and right. Normal is, that only the distal phalanx can come under the ribcage and when the stomach muscle are active, you will feel that immediately. An less tone and later contraction means that the front diagonal has an weak spot.

Mister A.: The tone of the stomach was low, more than the phalanx was easy to move under the ribcage and when he lift his head and laugh the tone was increasing slowly !
The tone of the oblique stomach muscle was lower than normal !!

(Right lift) . We start therefore by lifting the right leg
The patient must hold the arms on the stomach, when it is possible. Otherwise look how he use the arms as an anchor for his back diagonals and observe what he is doing with his head. Pushing the head into the pillow is an sign that the whole upper trunk is used as an anchor and that means that lower trunk has an great problem

- Is it possible to give on the **right** leg resistance and feel that this leg is hold firmly.

Mister A. : The lift of right leg is possible but resistance isn't possible. He cannot hold the leg with even little resistance. An sign that the front diagonal wasn't strong but how is the stability from the back diagonal.

- Feel of the **left** buttock tightening.
- Feel the pressure under the **left** heel.

Mister A: The pressure was too low the heel was easy to move over the bench.

Mister A: The buttock muscle was active but the tone of the muscle was not very high and it wasn't an complete muscle, there were parts that were not active !! Especially the keypoint part with the gluteus med. was low of tone.

- Feel the reaction in the **left** foot towards plantair flexion.

Mister A.: There was an clear action of the calf muscle. With an sign of inversion ( extensor movement synergy !!

- Pressure against the **right** leg to lateral of medial and what is the reaction in the remaining part of the body.

Mister A.: This was very difficult for him , holding the leg in the air and then the resistance against the outside or inside of the foot resist. That is an sign that the keypoint on the other side ( left leg ) isn't capable to control the body and he grasp with his both his hand the edge of the bench.

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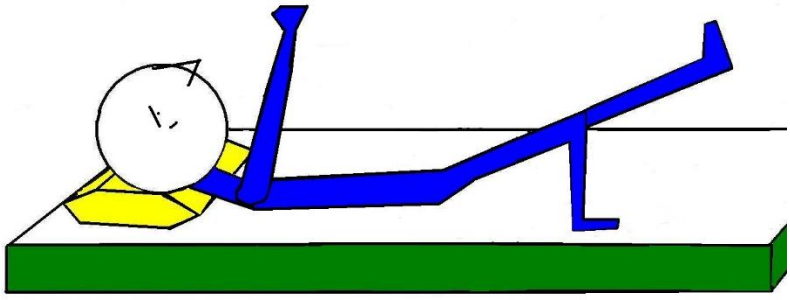
- Tentacle of the **left** leg and lift of the **right** leg.



Picture 15.
Lifting the buttock high in the air and lift the right leg in the air. Control of the keypoint of the left leg.
*Picture 15 published with the responsibility and permission of the author by j.v.d.Rakt.*

**Picture 15**

**When possible to the test also with an lift of the left leg .**

Mister A.: This was very difficult but he did it. He wasn't capable to hold the hip in 0° extension, the hip was only an small distance from the bench and that gives an sign, that the power of the buttock is to low and that the control of the keypoint isn't optimal. Standing on one leg is than difficult only through to little power. This was performed with the arms along his body.

- Resistance on the **left** leg.
- Reaction **right** buttock
- Reaction **right** heel
- Reaction in **right** foot toward plantair flexion.
- Pressure lateral / medial on **left** leg.
- Tentacle lift **left** leg and control **right** leg

Mister A.:
- Resistance wasn't possible .
- Right buttock the same as the other side

*Summary diagonals- and balance assessment:*
Mister A.: What we found in the balance reactions in sitting- and standing position, we found also in the diagonal assessment. The keypoints are weak especially is there an loss of muscle power, not directly related with loss of selectivity, but there are signs that the brain must use parts of the extensor movement synergy. The core stability, the buttock, stomach and the keypoints of the hip are the weakest part.

**Why - Alignment investigation.**

Which obstruction you have found, also hyper mobility? Character of the obstruction.
Head;
Trunk;
Arm;
Leg;
We found by Mister A. that passive movement in lying position was difficult in the head[34,35]. Especially rotation and lateroflexion give to the left more resistance.
With the head relaxed this was also the case and that pointed on an mobility loss in the cervical spine. Further was the extension in the cervical spine only an movement of the upper vertebrae of the cervical spine . Signs that the obstruction must be searched in the cervical joints.



The shoulder left and right were in an relax position movable till 150° but then the end sign was hard. The scapula move correctly and has an end position. Still his attitude in the thoracic spine makes it impossible to move further and the hard end are signs that the gleno-humeral joint isn't optimal ( indication for further echography[36] )
The lumbar spine has limited lateroflexion but equal on both side.
But there are signs that there are joint problems and that this must be investigated further.

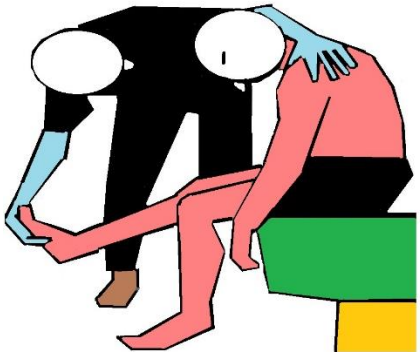
**Mister A. don't complaint about pain.**

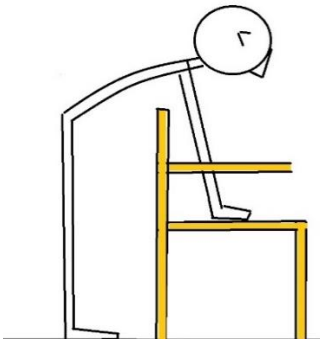
But by people with dementia pain give often another sign than by older without dementia. Using the Pacslac-D and the PAINAD [37,38,39]we observe that moving or when he move on his own so far as possible, or his head, trunk, shoulder and especially the joints of the hallux were painful.
Head: The rotations and lateroflexion and extension especially to the right.
Shoulders: When he go back after the lift his arm as high possible, than was in the movement down an "painful"[40] arc and his face and breathing changed.
The lumbar spine gives signs and the joint of the metatarsal of the hallux where thicker and the joint stand in an valgus position. Pressure give an face change. This could be an sign of gout .
It is so important that we know what problems there are and that this problem are well treated because this can explain why he behave on that way.
Example : the nurses of the ward said that he often forgot his rollator frame and sometimes he was walking with it but leave him and walk further with his arms in his back and when she try to get his arms along his body, he become an little bit angry and refused.
But walking with his arm free was also an movement in the shoulder joint what wasn't pleasant and because he has problems to hold his back diagonals on the right tone, he was walking with the arms on the back the best solution to get more back diagonals and counter the loss of this back diagonals in the hip.

In the alignment assessment was clear that he has complaints in his shoulders when he walk with the rollator frame. Is the high of the handle to high, lowering seem to help but still he stop with walking with on moments that was strange.
There were sign that he had "pain" when he walk with the rollator frame , his face was different and also his breathing change. But this moment were so different and not always after the same amount of time .
The lowering of the handle was improving but still there were moment that he stop walking with the rollator frame.

**Why - Alignment of the mobility of the nerves[43,44].**

1.General
Head and trunk (Slump)





**Picture 16 and 17.**
The official slump technique and an technique often be done by individuals with dementia. Also possible is long sit on the bench or bed.
*Picture 16 and picture 17 published with the responsibility and permission of the author by j.v.d.Rakt.*

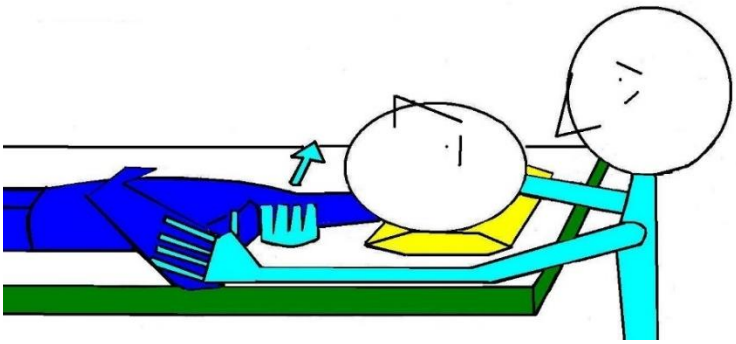


**Picture 16** **Picture 17**

Mister A.: In this case we choose the technique of picture 10 and in this position he move his head immediately every time in this position in extension. And the nerves in the leg were palpable.

2.Arms
Truncus, Left n.ulnaris, Left n. radialis , Left n. medianus ,Right n. ulnaris, Right n. radialis, Right n.medianus.

Mister A. was by all this test "not amused " and there was an resistance by all this test and especially the truncus test to the right was restricted and that means that the nerve from the cervical spine has an influence on the movements of the neck.



**Picture 18**

**Picture 18.**
Truncus technique.
A shift of the low cervical vertebrae and an depression of the shoulder can reveal that.
*Picture 18 published with the responsibility and permission of the author by j.v.d.Rakt.*

3.Legs .
Right n.ischiadicus, right n. femoralis, Left n.ischiadicus, Left n.femoralis.

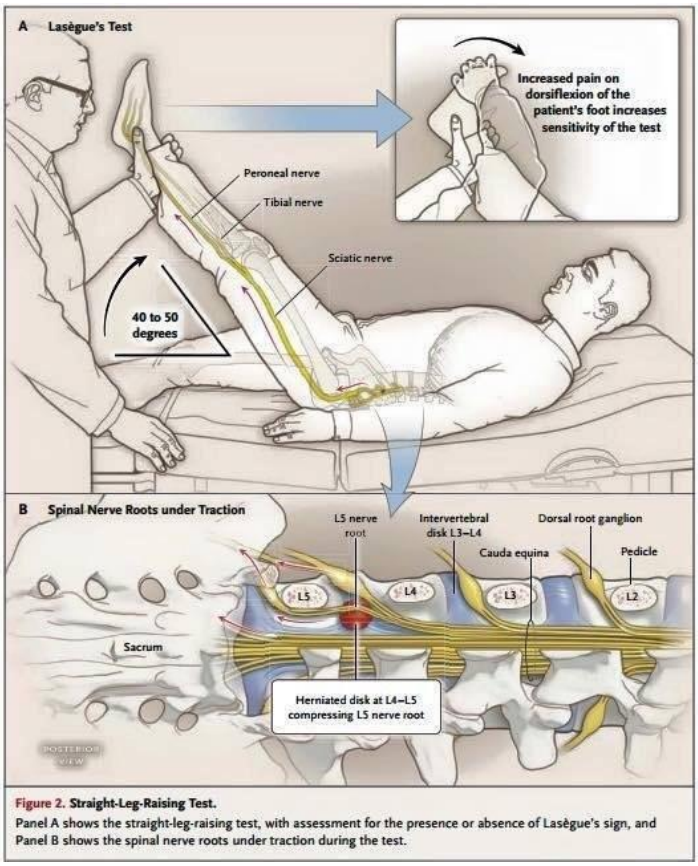



**Figure 5**

**Figure 5.**
Especially the test of the n.ischiadicus was by mister A. positive. He don't react with pain or other sensation but he push his head into the pillow every time.
And the nerve was palpable in the knee.This investigation of the nerves give us an sign that there is another problem and that he has an lumbar and maybe also an cervical stenosis.
That makes it difficult for him to hold the cervical and lumbar spine into extension because than is the space in the canal at its smallest. Flexion of the cervical and lumbar spine makes this space greater and he will have less discomfort.
Treatment is possible with slide technique, but the result is often little.
*Figure 5 published with the responsibility and permission of the author by j.v.d.Rakt.*

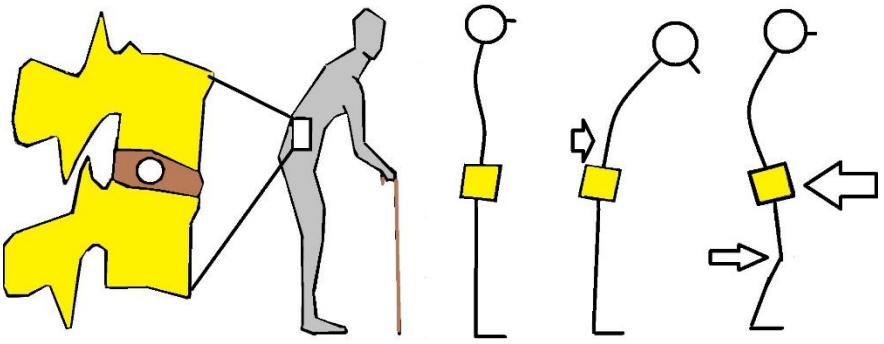


**Figure 6**



**Figure 7**

**Figure 6 and 7**.
The problem lumbar and the attitude to get the space so large as possible . By flexion lumbar or pelvis rotated back and flexion in the knee.
*Figure 6 and 7 published with the responsibility and permission of the author by j.v.d.Rakt.*

In an article[45]about lumbar stenosis gave an list of symptoms that belong by an lumbar stenosis. This was not tested and not confirmed by Rö photo's. About 44 -49 % of the people between the 60-70 years has this symptoms.

1. No pain when they are sitting down but often the sit done with an lower trunk backward .
2. Often problems with the urinary continent that isn't otherwise to explain.
3. Discomfort or pain is vanish when they are bending to the front.
4. Bilateral gluteal pain and pain in the legs.
5. Neurological claudication, meaning that the must stand still and often standing in an bending position to let the pain vanish.
6. An walking pattern with the legs far open and often abduction and exorotation in the hips and flexion in the knees.
7. Not normal test of Romberg. Eyes closed and things changes rapidly.

An great number of this symptoms are positive by Mister A. and it was obvious that the nerve stand under tension. Not only on lumbar level but maybe also on cervical level.
Strange sensations in the hand evoke through the position of the handles of the rollator
Frame, sensation through the nerve irritation in the wrist and fingers. That can explain also why he "forgot" his rollator frame because it gave him discomfort and pain but that pain sensation he translated in another behaviour.
Change in behaviour[46] from an individual with dementia and discomfort /pain is an great signal but we – physical therapist- must investigated and translated it in the reality of the day and search for an solution. Be aware that walking with an rollator frame is easier for him than walking on the way he does.
But the signal he gives is: "That the rollator frame give him discomfort and pain and that symptoms are gone when this rollator frame is gone".



To get more space in the cervical and lumbar region the handle must be lower but because the placement of the handles asked for an upper trunk backward through the demand of exorotation. Exorotation askes also for more movement of the nerves and can lead to rear feeling in his hand and that can be an reason that he leave the rollator frame and walk further without it.
An rollator frame that asked for less exorotation has be given and that gave an better solution but still , there are moments that he leave the rollator frame . But we know now why!!

**Photo 6**

**Photo 6.**
This rollator frame has on the handle an stave that makes it possible to control and walk with one hand.
This was used for people that had after an stroke not the possibility to control the rollator frame with two hand.
Still there is another important aspect .
Walking with an rollator frame- normal – ask for exorotation in the gleno-humeral joint and that asked for an upper trunk backward and that asked for extension in the spine on thoracal and cervical level.
In the case of Mister A. is every extension in the spine an reason that his nerve system will get under pressure and that he will feel sensation in his hands.
*Photo 6 published with the responsibility and permission of the author by j.v.d.Rakt.*

In the treatment plan is important to try an treatment that give less tension of the nerve system. That must be done on two places – cervical and lumbar – and because the space is so little, it is difficult to get an good result.
Tension on the nerves has always an effect on the tone of the muscle and on the power of the muscles. And an treatment of weak muscle is always possible but when the tension of the nerve system is increase that will this not give an strengthening of the system.
There is also an important task for the therapist to informed the people on the ward and the family because often there is an stimulus to stimulated mister A. to walk with an erect attitude behind the rollator frame and that isn't correct in his case.
We must investigated what the power in the muscles, he had and which possibilities he have on the neuropsychological and cognition level.
Why - MRC Resistance active [47]

0 = no contraction to feel.
1 = Visual and palpable contraction.
1,5 = Movement possible without gravity force.
2 = Movement over the whole tract without gravity force.
2,5 = Partial movement against the gravity force.
3 = Movement against the gravity force over the whole tract.
3,5 = Movement against light resistance over the whole tract.
4 = Movement against reasonable resistance.
4,5 = Movement against strong resistance but still not normal.
5 = Normal muscle force



| | Movement | Resistance | | Movement | Resistance |
|---|---|---|---|---|---|
| Head | Flexion | 5 | Elbow | Flexion 5 - 5 | Left Right |
| | Extension | 4 | | Extension | 5 5 |
| | Laterofl.left | 4 | | Supination | 5 - 5 |
| | Laterofl. right | 3,5 | | Pronation | 5 5 |
| | Rotatie left | 4 | Wrist | Ulnair deviation | 5 5 |
| | Rotatie right | 3,5 | | Radiaal deviation | 5 5 |
| Trunk Sit | | | | Dorsal flexion | 5 5 |
| Upper | Flexion | 4 | | Palmair flexion | 5 5 |
| | Extension | 3,5 | Fingers | Flexion | 5 5 |
| Whole trunk | Rotatie left | 4 | | Extension | 5 5 |
| Whole trunk | Rotatie right | 4 | Thumb | Extension | 5 5 |
| Lower | Flexion | 4 | | Flexion | 5 5 |
| | Extension | 4 | | Opposition | 5 5 |
| Whole trunk | Laterofl.left | 3,5 | | Abduction | 5 5 |
| Whole trunk | Latero fl. right | 3,5 | | Adduction | 5 5 |
| Arm | | | Hip | Flexion | 4 4 |
| Shoulder blade in side lying | Elevation | Left Right 5 5 | | Extension | 3,5 3,5 |
| | Depressie | 4 4 | | Abduction | 3,5 3,5 |
| | Laterorot. | 4 4 | | Adduction | 4,5 4,5 |
| | Mediarot. | 4 4 | | Endorotation | 4,5 4,5 |
| | Adduction | 4 4 | | Exorotation | 3,5 3,5 |
| | Abduction | 4 4 | Knee | Flexion | 4 4 |
| Shoulder | Anteflexion | 3? 3? | | Extension | 3,5 3,5 |
| | Retroflexion | 5 5 | Ankle | Dorsal flexion | 3 3 |
| | Abduction | 3? 3? | | Plantair flexion | 3,5 3,5 |
| | Adduction | 5 5 | | Inversion | 3,5 3,5 |
| | Exorotation | 3 3 | | Eversion | 3,5 3,5 |
| | Endorotation | 3 3 | Toe | Flexion | 5 5 |
| | | | | Extension | 3,5 3,5 |

**Table 8**

Mister A. . His strength was normal in his arms and hand. The problems we found where especially in his shoulder. The muscles in the hand were good despite the symptoms that occur after support on the rollator frame, but the muscles power was intact.
There is an relation with joint and nerve problems but there also the possibility to strengthening this weak muscle by give him am task specific resistance treatment. That this an treatment is, he knows

from his past with sport and then we can see of the inhibition of the other structures(joint/nerve) is too big.
Par example we can exercises in an more bending position and try to make the muscles in the leg work at an good level of R.M. and with the right rehearsal and frequency, that fatigue the muscle and give an stimulus to increase the coordination and the power of the muscles.

**Why -** Cognition etc.
Modified observation list[47]
Read the question and when think "yes", tick the square.

**Mister A has problems with ……..**

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**Attention**

Disturbances in arousal and concentration

*Description: Going in "sleeping " attitude when stimulation is inadequate.*

Sleep when there is inadequate stimulation is present:
Slow reaction. Moments of absent , do nothing and no initiation

Disturbances in pointing and selective attention.

*Description: Impossibility to point the attention to important stimuli when there are lot of other stimuli.*

Reaction in an activity on all intern and extern stimuli.
Reaction on irrelevant stimuli.
Difficulty with the search and finding of objects in an complex environment.

Disturbances in partial attention.

*Description: not capable to address the attention tot we or more stimuli on the same time.*

Difficulty to do more activity together in the same time.

Disturbances in flexibility of the attention and changing of attention area.

*Description: not capable to switch the attention from one stimulus to another.*

Difficulty to switch from one (partial) activity to another.

Disturbances in constraint attention.

*Description: not capable with concentration during an required time hold the attention.*

Difficulty to hold the attention the whole time the (partial) activity occur.
Quicker fatigue and therefore no attention by mental stress.

**Neglect**

Personal

*Description: attention of the affected side is not or insufficient present and there is no explanation by sense loss.*

The patient has no attention for the affected side during the A.D.L.

Peri - personal neglect

*Description: Attention for stimuli on the affected side is not or insufficient present in range of arm.*

The patient drives against object on the affected side.

Extra personal neglect

*Description: Attention for stimuli on the affected side are not or insufficient present outside the range of arm.*

The patient react op people that sit on the left but do this not or insufficient with people on the right(affected site).

Extinction

*Description: one stimulus that unilateral be felled on the affected side , but not more be felled when at the same time another stimulus is present on the not-affected side.*

The patient use his affected arm/hand not or less, as on the same time the other ( not-affected) arm is in action. The affected arm/hand well active alone.

**Observation ( Perception)**

Visual agnosia

*Description: incapable to recognized of familiar object visual , despite an good visual function.*

The patient isn't capable visual to find object , because he cannot recognized them.
Object are not be recognized, and A.D.L. action as wash, dress and eat of an meal is disturbed.
No recognition of spaces or rooms.
No recognition of faces.

Not capable to read the clock.

Acoustic agnosia ☐

*Description: Not capable to recognized familiar sounds auditory, but the auditory sense is well.*

No recognition of sounds.

Tactile agnosia ■

*Description: Not capable to recognized object with the tactile sense , but the tactile sense is well.*

No recognition of object trough tactile sense

Action don't succeed without visual control.

Somato-agnosia ☐

*Description: Disturbances in the recognition of the own body parts or body scheme.*

No recognition of an body part that it is his own.

Deny that this body part is from himself.



Spatial agnosia ☐

*Description: disturbances in the recognition of spatial relations.*

Problems in the building of an spatial picture of an route.

Problems with spatial of an piece of clothing.

Problems with spatial task.

Distances are over or under estimated, and objects are perceived more to the left or right.

**Activity – praxia.**

Intentional apraxia ☐

*Description: not capable tot o do functional actions , because the intention is disturbed.*

1. No capable to start with washing. And when the beginning is done by someone other is goes well.

Ideatoir apraxia ■

*Description: not capable to do functional actions because the acting plan is disturbed. Not knowing what to do.*

1. Problems with the sequence of the different step of acting.
2. There were steps leave out.
3. The patient has no idea what the next step is.
4. Perseveration because the patient don't know what the next step is.
5. Actions were not finish before the next activity starts.
6. Fragmentation of an activity.

The patient has no idea what he must do with an object or he use it wrong.

No idea how he must acting.

Ideomotor apraxia ■

*Description: Not capable to transfer an idea or plan in an motor realisation. There is an incapacity to act goal directed but the acting plan is intact. Knowing what to do but not how.*

Difficulty to adapt the grip in an asked action.

Move in the wrong movement direction.

Use of an body part as an object.

Perseveration

Only an part of the action realized.

**Memory**

Disturbed short memory. ■

*Description: problems with temporary, to disrupt memory storage of about 30 seconds , This formation is loosed and will be not storage in the long memory system.*

Forget recent events.

Disturbances in the appealing of information from the long memory. ■

*Description: Not remember information that is stored in the long memory and has no awareness of this information.*

Cannot remember appointments, know not your name en don't know what is happen yesterday

Difficulty to learn from errors and/or learn new strategies.

Problems with the remembering of personal events from time and place bounding recollection.

Forget objects, appointment and previous familiar things.

The patient invent story to height his memory problems.

**Orientation**

Orientation in time. ■

*Description: knowledge about which day, month and year it is and about time perception and time judgement .*

Not knowing which day, month or year it is.

Not knowing how late it is even not by approach

Disturbed time awareness.

Orientation in place. ■

*Description: Knowledge about the place where somebody is and knowing about the function of that place.*

Don't know where he is.

Unable to find the way.

Orientation in person ■

*Description: knowledge about the own person and for the patient acquaintance.*

Own personal facts not capable to give them.

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Don't recognized familiar persons and not familiar person after an short time after the first meeting.

Orientation in space ■

*Description: knowledge about how to find the way in an familiar environment.*

Is not able to find his way in an familiar environment.

**Communication**

Verbal communication ■

Problems with the understanding of spoken language.

Problems with expressing himself with spoken language.

Problems with intonation, sound and melody.

Fast changing of the topic.

Non-verbal communication □

Problems with non – verbal communication.

Written communication ■

No able to read

Not able to write

Not able to read ciphers.

Use of rules of communication ■

Don't hold himself on the rules of communication.

**Executive functions**

Disturbed disease insight ■

*Definition: The consequences of an disease not see or even deny them.*

Makes unrealistic remarks about his disease or handicap.

No insight in own functioning and/or over -estimated his own possibilities.

Loss of initiative. □

*Definition: able to set goals and start out of his own.*

Not capable to start with an action on his own.

Planning and organisation ■

*Definition: capacity to search goal pointed to find solutions and parts of the choosing solution places in the right sequence.*

Start with action without to think in front which object are necessary.

Flexibility □

*Definition: Have the capacity to adapt behaviour or the solution of the problem on different circumstances.*

When an action don't succeed , not knowing another solution but continued on the same manner.

Impulsiveness □

*Definition: Not capable to keep under control impulses and not capable to changes wrong behaviour.*

Difficult to wait and start with not well thought-out not well thinking actions.

Disturbed self-control and self-correction. ■

*Definition: Not capable to adapt the own behaviour of the self-chosen solution for an problem and also not capable to adapt on the feedback of others in the neighbourhood.*

Makes no use of feedback on his actions.

Don't see that he doing something wrong as the environment point on it , not capable to changes his actions

**Treatment Plane with hydro therapy[49,50].**

Mister A. has great problems with his balance. The lateral balance system is very weak and he isn't capable to correct when he is out balance sideway. But also his balance system to the front and to the back is fragile. The muscle pattern aren't complete and he will never be on time to correct an fall.
But there is another problem and that is the complication caused through the tension on the nerve system, that makes it difficult for him to used aid systems. We must therefore look to his environment what is an stimulation for him to hold his independency. And he will not remember what for him is the best chair, toilet bed etc.[51] We must take care that this is for him logical.
We want to give him exercises with the focus on two aspects;



1. Because he likes training, there must be an part aerobe because that is good for his cardio pulmonic system and is the best remedy for slowing down his loss of cognition ( at least 2 times in an week)
2. There is an loss an muscle power and coordination therefore is an task-specific resistance therapy important and that therapy must focus on the muscle pattern of the diagonals to get an better balance in all direction especially of the lower trunk /hip.
3. There will be also an treatment needed to change the tension in the nerve system and maybe also an treatment for his complains of the shoulders/neck and lower back.

But aerobe and anaerobe are the most important part and that must be done in his context because than he and the people on the ward see what he performed.
Often we do this especially on the ward and also in the therapy ward in groups of 5 people. The therapy is individual but the other 4 are part and will stimulated and imitated each other to get the best performance for each individual.
Therefore it isn't no group therapy [52] because that level is the level of the weakest person but individual therapy at his highest level but always with the stimulation of the others and the feeling "that he is stronger that the therapist ".
Make resistance therapy something between the individual and the therapist.
Because he loved water, we choose for one an week exercising in water and that program we do also on land but the difference was very great between what he performed in water and what he can on land.
Where in the water with an level around thoracic 11 his arm were free. On land was the closing of the arm long necessary to keep the back diagonal under control and that change particularly when the treatment on the nerves was giving some progress. That was also the point that family and members of the ward found that he was change in his behaviour. We have slowing down the process and had influence on the tension on the nerves but also his balance and independency was improved.
Clinometric after 5 months of exercise show some changes.
But despite of the therapy that all that time continued and he was always enjoyed it, is dementia an degenerative disease and after 1 years the level was almost the same as 1 years ago.
But we find this an great result and the therapy continued. This isn't always possible with the individual with dementia but still when there is an exercise possibility than give an treatment on the right level and when that isn't possible than be an support on the ward to stimulate the movements that are required on the ward , out of bed, toilet , chairs, walking through the corridor etc.

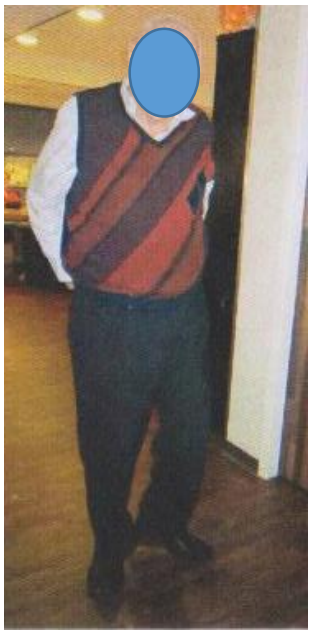

**Photo 7**

**Photo 7**.
Clinometric when the treatment start :
**T. C. T.[53]**; 25/25/12 25 = 88 - **B.B.S.**; 33 **S.W.W.T.[54]**:not possible
**One leg standing[55]** ; 10 sec. **Rikli & Jones[56]** : 80 year- Sit to stand 8/ 6 minutes 100 m/ Steps 50/ Reach 8 inch / Back reach 15 inch / Time up and go 14 sec.
Clinometric after 5 mounts ;
**T. C. T.**; 25/25/25 25 = 100 - **B.B.S.**; 43 **S.W.W.T.**: "possible with rollator frame **One leg standing** ; 20 sec. **Rikli & Jones** : 80 year- Sit to stand 16/ 6 minutes 250 m/ Steps 80/ Reach 16 inch / Back reach 30 inch / Time up and go 9 sec.
Clinometric after 1 years;
**T. C. T.**; 25/25/25 25 = 100 - **B.B.S.**; 33 **S.W.W.T.**:not possible
**One leg standing** ; 10 sec. **Rikli & Jones** : 80 year- Sit to stand 8/ 6 minutes 100 m/ Steps 50/ Reach 10 inch / Back reach 20 inch / Time up and go 14 sec.
*Photo 7 published with the responsibility and permission of the author by j.v.d.Rakt.*

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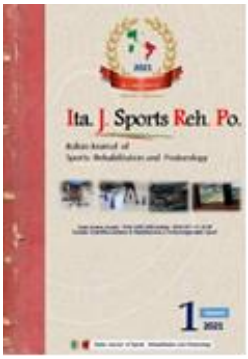


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