

#### **4. Daily examination**

In the following chapter, I am reporting the Daily examination content from the 19<sup>th</sup> of January until the 2<sup>nd</sup> of February 2021. The 29<sup>th</sup> February's session is missing as the patient was unable to participate.

19/01/2021

#### **1<sup>st</sup> Session**

##### **Subjective**

Pain grading: No pain described

Feeling: Major complaint associated with walking inability, instability and inability to accomplish daily tasks with the upper extremity.

In the present session the patient reports upper body tiredness, following ergotherapy.

Medication: None

##### **Objective**

Inspection:

- Generalized hypotonus of the left body hemisphere
- Reduced ability to activate left body hemisphere muscles
- Increased muscle activation latency on affected side

##### **Assessment**

Patient's main problem consists in muscle activation. If solicited, he is able to activate the involved muscles except for more distal and spastic-antagonist muscles, particularly in the lower extremity, given that the upper extremity doesn't present signs of spasticity.

Blockage in dorsal direction of both sub-talar and talocrural joint on the left side, according Lewit's techniques.

##### **Plan**

Main objective:

- Anti-spastic muscles strengthening and improving/maintaining general mobility in anti-spastic movements. Main focus on activation of left ankle dorsiflexors, knee flexors and hip general mobility (abduction++)
- Stretching of plantar flexors, hip flexors (mono and bi-articular) and hip adductors

-Blocked joints mobilisation according Lewit's techniques.

Secondary objective:

-Gait pattern correction (assisted): improvement of weight bearing and symmetrical stride length

## **Therapy**

- Anti-spastic muscles strengthening and improving/maintaining general mobility in anti-spastic movements: AARoM performed 6 times per 3 sets (for every muscle) (tibialis anterior in supine position, peroneus tertius in supine position, biceps femoris in prone, semitendinosus and semimembranosus in prone, gluteus medius in supine position, gluteus maximus in side-lying position). The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient.
- Stretching of plantar flexors, hip flexors (mono and bi-articular) and hip adductors:
  - Plantar flexors (biarticular) stretching: in supine with the feet out of the table, manual contact on the calcaneum of the treated side and with the other hand on the knee for maintaining it straight. The pressure is applied with the volar part of the forearm of the arm supporting the heel, on the forefoot. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  - Plantar flexors (monoarticular) stretching: in prone with the knee at 90° of flexion, manual contact on the forefoot of the treated side and with the other hand on the thigh for stabilizing the LE. The pressure is applied on the forefoot of the treated side with the therapist's thenar and hypothenar. The amount of pressure applied

is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.

- Hip flexors (biarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE’s hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower leg (above the ankle), in posterior direction (providing knee flexion). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
- Hip flexors (monoarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE’s hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower thigh (at the hight of the vastus medialis, but more central), in posterior direction (to the ground). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
- Hip adductors (monoarticular) stretching: in supine with the treated LE in full knee flexion and maximal hip horizontal abduction. One hand of the therapist is applied on the treated side’s thigh at the

level of the vastus medialis; the contralateral hand is applied on the contralateral spina iliaca antero-superior in order to prevent the pelvis rotation during the stretch. The pressure is applied on the thigh and the contralateral hand controls the maintenance of the pelvis stable position. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.

- Blocked joints mobilisation: manual mobilisation of left talocrural and subtalar joint dorsally according Lewit. The joint mobilisation is performed until the mobility is restored. The joint-play is restored in the end of the mobilization treatment.
  
- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.  
The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

### **Results after session**

The patient refers tiredness given his hard effort in trying to activate the muscles on the affected side. No pain is described. The joints observed as blocked, were mobilized according Lewit's techniques, learned during the bachelor course.

**Recommendations**

The patient is asked to try to perform a normal ADL, without self-imposing limits, still being assisted by the personal of the structure. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation.

## 2<sup>nd</sup> Session

### **Subjective**

Pain grading: No pain described except for slight pain (2/10) on inferior part of left patella when walking.

Feeling: Major complaint associated with walking inability, instability and inability to accomplish daily tasks with the upper extremity.

In the present session he reports to be tired in the upper body after the ergotherapy session.

Medication: None

### **Objective**

Inspection:

- Generalized hypotonus of the left body hemisphere
- Reduced ability to activate left body hemisphere muscles
- Increased muscle activation latency on affected side
- No sensory impairment
- Left sub-talar and talocrural joint blockage

### **Assessment**

Patient's main problem consists in muscle activation. If solicited, he is able to activate the involved muscles except for more distal and spastic-antagonist muscles particularly in the lower extremity, given that the upper extremity doesn't present signs of spasticity.

Blockage of sub-talar and talocrural joint on the left side in dorsal direction.

Improved contraction ability of left plantar dorsiflexors hallucis and toes extensors.

### **Plan**

Main objective:

- Anti-spastic muscles strengthening and improving/maintaining general mobility in anti-spastic movements. Main focus on activation of left ankle dorsiflexors, knee flexors and hip general mobility (abduction++)
- Stretching of plantar flexors, hip flexors (mono and bi-articular) and hip adductors
- Blocked joints mobilisation

Secondary objective:

-Gait pattern correction (assisted): improvement of weight bearing and symmetrical stride length.

## Therapy

- Anti-spastic muscles strengthening and improving/maintaining general mobility in anti-spastic movements: AARoM performed 6 times per 3 sets (for every muscle) (tibialis anterior in supine position, peroneus tertius in supine position, biceps femoris in prone, semitendinosus and semimembranosus in prone, gluteus medius in supine position, gluteus maximus in side-lying position). The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient.
- Stretching of plantar flexors, hip flexors (mono and bi-articular) and hip adductors:
  - Plantar flexors (biarticular) stretching: in supine with the feet out of the table, manual contact on the calcaneum of the treated side and with the other hand on the knee for maintaining it straight. The pressure is applied with the volar part of the forearm of the arm supporting the heel. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  - Plantar flexors (monoarticular) stretching: in prone with the knee at 90° of flexion, manual contact on the forefoot of the treated side and with the other hand on the thigh for stabilizing the LE. The pressure is applied on the forefoot of the treated side with the therapist's thenar and hypothenar. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is

observed progressive increasing of RoM in the direction of the stretch.

- Hip flexors (biarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE's hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower leg (above the ankle), in posterior direction (providing knee flexion). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
- Hip flexors (monoarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE's hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower thigh (at the height of the vastus medialis, but more central), in posterior direction (to the ground). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
- Hip adductors (monoarticular) stretching: in supine with the treated LE in full knee flexion and maximal hip horizontal abduction. One hand of the therapist is applied on the treated side's thigh at the level of the vastus medialis; the contralateral hand is applied on the contralateral spina iliaca antero-superior in order to prevent the pelvis rotation during the stretch. The pressure is applied on the



thigh and the contralateral hand controls the maintenance of the pelvis stable position. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.

- Blocked joints mobilisation: manual mobilisation of left talocrural and subtalar joint dorsally according Lewit. The joint mobilisation is performed until the mobility is restored. The joint-play is restored in the end of the mobilization treatment.
- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.  
The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

### **Results after session**

The patient refers tiredness given his hard effort in trying to activate the muscles on the affected side. No pain is described. Concerning the left sub-patellar area's pain, he reports that it reduces when walking and with the stretching. The joints observed as blocked, were mobilized according Lewit's techniques, learned during the bachelor course. The patient refers that the lower extremity is more mobile and the movement is perceived as more fluid after the treatment.

## **Recommendations**

The patient is asked to try to perform a normal ADL, without self-imposing limits, still being assisted by the personal of the structure. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. Walking is only permitted if accompanied by healthcare professionals and accompanied by a wheel-chair for resting.

### **3<sup>rd</sup> Session**

#### **Subjective**

Pain grading: No pain described

Feeling: The patient describes less tiredness after ergotherapy and electrostimulation session

Medication: None

#### **Objective**

Inspection:

- Physiological movement in left talocrural and sub-talar joints
- Improved ability and confidence during wheelchair's transfers
- Prolongation of time spent standing (still under 1 minute)

#### **Assessment**

Improved muscles activation ability and reduced latency in muscular activation. The patient still shows greater weakness signs in the upper extremity compared to the lower extremity of the affected side. The weakness is observed particularly in the antispastic muscles, notoriously in the LE given that the UE doesn't show yet signs of spasticity.

#### **Plan**

Main objective:

- Anti-spastic muscles strengthening and improving/maintaining general mobility in anti-spastic movements. Main focus on activation of left ankle dorsiflexors, knee flexors and hip general mobility (abduction++)
- Stretching of plantar flexors (mono and bi-articular), hip flexors (mono and bi-articular) and hip adductors
- Recover symmetrical functionality of the facial muscles: Facial muscles' motor control training.

Secondary objective:

- Gait pattern correction (assisted with right-side stick): improvement of weight bearing and symmetrical stride length. Improving the covered distance without rest (50m).

-Assisted stairs climbing: approaching stairs climbing with pathology-related modifications.

## Therapy

- Anti-spastic muscles strengthening and improving/maintaining general mobility in anti-spastic movements: AARoM performed 6 times per 3 sets (for every muscle) (tibialis anterior in supine position, peroneus tertius in supine position, biceps femoris in prone, semitendinosus and semimembranosus in prone, gluteus medius in supine position, gluteus maximus in side-lying position). The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient.
  
- Stretching of plantar flexors, hip flexors (mono and bi-articular) and hip adductors:
  - Plantar flexors (biarticular) stretching: in supine with the feet out of the table, manual contact on the calcaneum of the treated side and with the other hand on the knee for maintaining it straight. The pressure is applied with the volar part of the forearm of the arm supporting the heel. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
  - Plantar flexors (monoarticular) stretching: in prone with the knee at 90° of flexion, manual contact on the forefoot of the treated side and with the other hand on the thigh for stabilizing the LE. The pressure is applied on the forefoot of the treated side with the therapist's thenar and hypothenar. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is

observed progressive increasing of RoM in the direction of the stretch.

- Hip flexors (biarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE's hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower leg (above the ankle), in posterior direction (providing knee flexion). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
- Hip flexors (monoarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE's hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower thigh (at the height of the vastus medialis, but more central), in posterior direction (to the ground). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
- Hip adductors (monoarticular) stretching: in supine with the treated LE in full knee flexion and maximal hip horizontal abduction. One hand of the therapist is applied on the treated side's thigh at the level of the vastus medialis; the contralateral hand is applied on the contralateral spina iliaca antero-superior in order to prevent the pelvis rotation during the stretch. The pressure is applied on the

thigh and the contralateral hand controls the maintenance of the pelvis stable position. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.

- Recover symmetrical functionality of the facial muscles: facing the mirror, the patient is asked to perform mimic expression involving all the responsible muscles (e.g. risorius, buccinator, mentalis, zygomatics, orbicularis orii). When the asymmetrical or inappropriate syncretism is observed, the patient is asked, first verbally and after by manual contact, to modify this behaviour. The contralateral side is used as a model to follow, when the activation happens in a correct form.
  
- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.  
The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.
  
- Assisted stairs climbing: assisted by 2 therapists, the patient is instructed how to climb stairs safely with both legs leading. The stairs-climbing is trained with handle assistance and, later, with stick assistance.  
The patient refers it to be hard but he has all the interest in being able to manage the task.

**Results after session**

The patient refers tiredness given the actual session and the previous therapies (electrotherapy and ergotherapy). Despite the tiredness, he declares to be satisfied by the early effects of the treatment, notoriously for what concerns the ability to use the leg. No pain is described. The patient refers that the lower extremity is more mobile and the movement is perceived as more fluid after the treatment.

**Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. Walking is only permitted if accompanied by healthcare professionals and accompanied by a wheel-chair for resting.

## **4<sup>th</sup> Session**

### **Subjective**

Pain grading: No pain described

Feeling: The patient describes tiredness after ergotherapy session

Medication: None

### **Objective**

Inspection:

- General lower extremity strength improvement
- Autonomy improvement in displacements and bed transitions
- More visible reflexes (paretic and spastic-irritative)
- Still marked weakness of the upper extremity compared to lower

### **Assessment**

The patient observes the first benefits of the therapy in terms of autonomy and ability of performing ADL. During walking (assisted with high-walker), the patient performs hip circumduction on the affected side and holds a narrow base of support. The steps are uncertain and they might be one in front of the other (dangerously).

### **Plan**

Main objective:

- Improve voluntary muscles activity in the upper extremity: PNF 1st and 2nd diagonal (with important assistance)
- Recover symmetrical functionality of the facial muscles: Facial muscles' motor control training.
- Removal of wrong walking pattern (knee extension stiff-ness and hip circumduction): functional training for proper hip and knee flexion/extension motion.

Secondary objective:

- Gait pattern correction (assisted with right-side stick): improvement of weight bearing and symmetrical stride length.
- Assisted stairs climbing: correcting wrong patterns



## Therapy

- Improve voluntary muscles activity in the upper extremity: the patient is asked to perform PNF 1<sup>st</sup> and 2<sup>nd</sup> diagonal in both flexion and extension (methodology according Kabatt). Initially the patient is briefly instructed about the practical concept behind this method. Furthermore, he is shown passively how the movement should be performed. Once that he understood the correct execution, he will start performing the movement in an AARoM movement. The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient. Each diagonal is performed 6 times per 3 sets. The 2<sup>nd</sup> flexion diagonal is performed 4 sets given the activation of the anti-spastic muscles.
- Improve voluntary muscles activity in the upper extremity: PNF of the scapula in caudo-medial direction (according Kabatt methodology). The movement is initially performed passively, later actively. The movement is performed 6 times per 3 sets. The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient.
- Recover symmetrical functionality of the facial muscles: facing the mirror, the patient is asked to perform mimic expression involving all the responsible muscles (e.g. risorius, buccinator, mentalis, zygomatics, orbicularis orii). When the asymmetrical or inappropriate syncretism is observed, the patient is asked, first verbally and after by manual contact, to modify this behaviour. The contralateral side is used as a model to follow, when the activation happens in a correct form.
- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.

The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

- Assisted stairs climbing: assisted by 2 therapists, the patient is instructed how to climb stairs safely with both legs leading. The stairs-climbing is trained with handle assistance and, later, with stick assistance. The patient refers it to be hard but he has all the interest in being able to manage the task.

### **Results after session**

The patient refers tiredness given the actual session and the previous therapies (ergotherapy). Despite the tiredness, he declares to be satisfied by the early effects of the treatment, notoriously for what concerns the ability to use the leg and to start walking. No pain is described. The patient refers that the lower extremity is more mobile and the movement is perceived as more fluid after the treatment

### **Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. Walking is only permitted if accompanied by healthcare professionals and accompanied by a wheel-chair for resting. The movement he is asked to perform are the same one as during the treatment (i.e. . For the moment, the patient is not allowed to climb stairs out of the Physiotherapy sessions).

## **5<sup>th</sup> Session**

### **Subjective**

Pain grading: No pain described

Feeling: Patient is satisfied of the progressions made. Satisfied of being able to walk again.

Still problems in upper extremity functionality.

Medication: None

### **Objective**

Inspection:

- General strength improvement notoriously in the lower extremity
- Autonomy improvement in general transitions (stick-assisted walking)
- More visible reflexes (paretic and spastic-irritative)
- Still marked weakness of the upper extremity compared to lower

### **Assessment**

The patient lower extremity strength and autonomy is increased. In particular the patient is able to activate easily the anti-spastic muscles (e.g. tibialis anterior 3-/ 5). Still marked weakness is detected on the upper extremity. Paretic facial muscles show signs of improvement being symmetrical in terms of activity.

### **Plan**

Main objective:

- Improve voluntary muscles activity in the upper extremity: PNF 1st and 2nd diagonal (with important assistance)
- Recover symmetrical functionality of the facial muscles: Facial muscles' motor control training.
- Removal of wrong walking pattern (knee extension stiff-ness and hip circumduction): functional training for proper hip and knee flexion/extension motion
- Hip flexors relaxation (mono and bi-articular): PIR method
- Plantar flexors relaxation (mono and bi-articular): PIR method

Secondary objective:

-Gait pattern correction (assisted with right-side stick): improvement of weight bearing and symmetrical stride length

## Therapy

- Improve voluntary muscles activity in the upper extremity: the patient is asked to perform PNF 1<sup>st</sup> and 2<sup>nd</sup> diagonal in both flexion and extension (according Kabatt methodology). Initially the patient is briefly instructed about the practical concept behind this method. Furthermore, he is shown passively how the movement should be performed. Once that he understood the correct execution, he will start performing the movement in an AARoM movement. The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient. Each diagonal is performed 6 times per 3 sets. The 2<sup>nd</sup> flexion diagonal is performed 4 sets given the activation of the anti-spastic muscles.
- Improve voluntary muscles activity in the upper extremity: PNF of the scapula in caudo-medial direction (according Kabatt methodology). The movement is initially performed passively, later actively. The movement is performed 6 times per 3 sets. The amount of assistance provided is enough to give movement support but not enough to replace the voluntary maximal contraction of the patient.
- Recover symmetrical functionality of the facial muscles: facing the mirror, the patient is asked to perform mimic expression involving all the responsible muscles (e.g. risorius, buccinator, mentalis, zygomatics, orbicularis orii). When the asymmetrical or inappropriate syncretism is observed, the patient is asked, first verbally and after by manual contact, to modify this behaviour. The contralateral side is used as a model to follow, when the activation happens in a correct form.
- Hip flexors relaxation (mono and bi-articular): PIR method is applied in supine position. The positioning is similar to the hip flexors' stretching

position (Lewit methodology). The stretching barrier is not reached. The patient is asked to inhale and offer resistance to the manual contact on the leg (provide hip flexion for monoarticular flexors and provide knee extension combined with slight hip flexion for biarticular flexors). After 10 second, he is asked to exhale and relax. The further barrier is reached only if the muscle allows it. PIR method is repeated 6 times per 3 sets. After the treatment the patient describes the release of the hip flexors.

- Plantar flexors relaxation (mono and bi-articular): PIR method is applied in supine position (biarticular) or in prone (monoarticular). The position is similar to the plantar flexors stretching. The stretching barrier is not reached. The patient is asked to inhale and offer resistance to the manual contact on the forefoot. After 10 second, he is asked to exhale and relax. The further barrier is reached only if the muscle allows it. PIR method is repeated 6 times per 3 sets. After the treatment the patient describes the release of the plantar flexors.
  
- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.  
The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

### **Results after session**

The patient refers that the lower extremity is more mobile and the movement is perceived as more fluid after the treatment. From a global point of view, he describes an increased ability to voluntary control the lower limb movement.

## **Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. Walking is only permitted if accompanied by healthcare professionals and accompanied by a wheel-chair for resting. Concerning the UE, the patient was given a stick, aiming to reproduce the AARoM exercises for the shoulder and elbow mobility, in order to be able to train in the room. These exercises should be repeated during the afternoon at least twice a day. For the moment, the patient is not allowed to climb stairs out of the Physiotherapy sessions.

## **6<sup>th</sup> Session**

### **Subjective**

Pain grading: No pain described

Feeling: Tiredness particularly related to the upper extremities

Medication: None

### **Objective**

Inspection:

- Upper extremity general weakness
- Stable symmetry of facial muscles activity
- Ribs (1st to 6th) blockage in both anterior and posterior aspect (inhalation and exhalation)
- SI joint bilateral blockage (superior part)

### **Assessment**

Despite the Ergotherapy intensive training, the upper extremity doesn't show marked progression of proximal joints (shoulder). The wrist and fingers extensors neither show progression signs. The lower extremity improved ARoM and mobility in anti-spastic patterns.

### **Plan**

Main objective:

- All examined blocked joint mobilisation, performed according Lewit's methodology
- Scapular mobility: PNF diagonals (all 4)
- Scapular mobility: scapulo-thoracic passive mobilisation
- Active-Assistive UE joint mobilisation (sitting and supine: Flexion, Extension, Abduction, Horizontal abduction and adduction)

Secondary objective:

- Gait pattern correction (assisted with right-side stick): improvement of weight bearing and symmetrical stride length.
- Assisted stairs climbing: correcting wrong patterns

## Therapy

- Blocked joints mobilisation: manual mobilisation of both SI joints (superior part) performed in side-lying position, ribs mobilization from the anterior part in both inhalation and exhalation according Lewit. The joint mobilisation is performed until the mobility is restored. The joint-play is restored in the end of the mobilization treatment.
- Scapular mobility: all four PNF diagonals are performed initially passively and later actively (according Kabatt methodology). Each diagonal (anterior elevation, posterior depression, posterior elevation, anterior depression) are performed 10 times and repeated 3 times.
- Scapular mobility: scapulo-thoracic passive mobilisation in side lying position is performed in rotary direction (clockwise and anticlockwise) in order to improve the scapular mobility (according Lewit technique). The rotations are performed until the mobility improves. When the mobility improvement stagnates, then the procedure is concluded.
- Active-Assistive UE joint mobilisation: the patient is in sitting or supine position. From this position, he is asked to hold a stick with both hands and perform separately: Shoulder flexion, extension, Abduction, Horizontal abduction, elbow flexion and extension). Every movement is also assisted by the therapist in order to perform support when required for controlling the property of the movement. Every movement was performed 6 times and repeated for 3 sets. The patient reports that the movement is hard but he is able to perform it in a self-assisted way.
- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.  
The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging



phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

- Assisted stairs climbing: assisted by 2 therapists, the patient is instructed how to climb stairs safely with both legs leading. The stairs-climbing is trained with handle assistance and, later, with stick assistance. The patient refers it to be hard but he has all the interest in being able to manage the task.

### **Results after session**

The joints observed as blocked, were mobilized according Lewit's techniques, learned during the bachelor course. The patient refers an improvement of the UE mobility. Despite the improvements, the patient is able to feel the onset of spasticity and its effects on the body.

### **Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. Concerning the UE, the patient was given a stick, aiming to reproduce the AARoM exercises for the shoulder and elbow mobility, in order to be able to train in the room. These exercises should be repeated during the afternoon at least twice a day. These exercises should be repeated during the afternoon at least twice a day, 3 sets per movement of 6 repetitions (sitting and supine: Flexion, Extension, Abduction, Horizontal abduction and adduction). For the moment, the patient is not allowed to climb stairs out of the Physiotherapy sessions.

In case of inability to perform a movement in full RoM because of spasticity, the patient is recommended not to try to overcome this limit through the force application but working on the control of it and performing slower movement with focus on involved muscles.

## 7<sup>th</sup> Session

### **Subjective**

Pain grading: No pain described

Feeling: Satisfied by the improvements in walking. Able to move without wheelchair.

Walking with stick support on the right hand.

Medication: None

### **Objective**

Inspection:

- Improvement of voluntary contraction of left upper extremity muscles
- Free bilateral SI joint
- Blocked left sub-talar and talocrural joints

### **Assessment**

Patient's main problem consists in muscle activation. If solicited, he is able to activate the proximal joints involved muscles (hip and shoulder joint). More distal muscles are more sensitive to voluntary contraction but still weak (particularly anti-spastic ones). Blockage of sub-talar and talocrural joint on the left side.

### **Plan**

Main objective:

- Pelvis mobilisation: PNF pelvic diagonals
- Crossed-chain muscles activation: 4 ½ months position
- Blocked joints mobilisation according Lewit's techniques
- Hip adductors relaxation: PIR method
- Hip external rotators relaxation: PIR method

Secondary objective:

- Gait pattern correction (assisted): improvement of weight bearing and symmetrical stride length

## Therapy

- Pelvis mobilisation: all four PNF diagonals are performed initially passively and later actively (according Kabatt). Each diagonal (anterior elevation, posterior depression, posterior elevation, anterior depression) are performed 10 times and repeated 3 times.
- Crossed chain muscle activation (according Kolar): the patient is placed in side-lying position, with the upper hand in contact with the table and the lower one, under the head. The upper leg is placed in greater flexion ( $80^{\circ}$ ) in the hip and the knee is in contact with the table. The lower leg is placed in semi-flexion position (almost straight). The patient is asked to offer resistance to the pressure which is simultaneously applied on the left anterior superior iliac spine (in dorsal direction), and on the posterior aspect of the left shoulder (in ventral direction). This position is held for 30 seconds and later the pressure application is opposed. This exercise is performed 6 times per side, on both sides. The patient expresses the difficulty in maintaining a normal breathing pattern during the exercise.
- Blocked joints mobilisation: manual mobilisation of left talocrural and subtalar joint dorsally according Lewit. The joint mobilisation is performed until the mobility is restored. The joint-play is restored in the end of the mobilization treatment.
- Hip adductors relaxation: the patient is placed in the same position as for the stretching (see stretching for adductors) with the same manual contact. The stretching barrier is not reached. The patient is asked to inhale and offer resistance to the manual contact on the leg (provide hip horizontal adduction for monoarticular adductors). After 10 second, he is asked to exhale and relax. The further barrier is reached only if the muscle allows it. PIR method is repeated 6 times per 3 sets. After the treatment the patient describes the release of the hip adductors.
- Hip external rotators relaxation (piriformis) (according Lewit's PIR methodology): the patient is placed in prone (semi side-lying) position with

the treated leg at 90° flexion at the level of the knee. From this position the homolateral hip is brought into internal rotation through the manual contact on the medial malleolus. The movement is performed until before the stretching barrier. From this position, the patient is asked to inhale and perform external rotation towards the hand resistance. After 10", the patient is asked to exhale and relax. The further barrier is reached only if the muscle allows it. PIR method is repeated 6 times per 3 sets. After the treatment the patient describes the release of the gluteal area.

- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right, on slightly unstable surface (smooth mat). Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.

The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

### **Results after session**

The joints observed as blocked, were mobilized according Lewit's techniques, learned during the bachelor course. The patient refers an improvement of the LE mobility after the employ of PIR method, notoriously in the proximal joints. Despite the improvements, the patient is able to feel the onset of spasticity and its effects on the body.

### **Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Concerning

the UE, the patient was given a stick, aiming to reproduce the AARoM exercises for the shoulder and elbow mobility, in order to be able to train in the room. These exercises should be repeated during the afternoon at least twice a day. These exercises should be repeated during the afternoon at least twice a day, 3 sets per movement of 6 repetitions (sitting and supine: Flexion, Extension, Abduction, Horizontal abduction and adduction). For the moment, the patient is not allowed to climb stairs out of the Physiotherapy sessions.

The patient is instructed to perform voluntary hip mobility in horizontal abduction and perform PIR method on the hip adductors in order to improve the RoM and reduce spasticity effects. This should be performed at least twice a day (in the afternoon) for 3 sets each time.

## **8<sup>th</sup> Session**

### **Subjective**

Pain grading: No pain described

Feeling: In the present session the patient reports marked general tiredness

Medication: None

### **Objective**

Inspection:

- Lower extremity spastic position visible onset
- Constant autonomy improvement
- Marked spastic reflex, paretic (notoriously in the lower extremity) and spastic-irritative signs
- Global progression of ARoM in the upper extremity (shoulder and elbow joint)
- Left carpo-metacarpal joint blockage

### **Assessment**

The patient lower extremity strength and autonomy is increased. In particular the patient is able to activate easily the anti-spastic muscles (e.g. tibialis anterior). Still moderate weakness is detected on the upper extremity. Paretic facial muscles show signs of improvement being symmetrical in terms of activity.

### **Plan**

Main objective:

- Restore physiological ARoM in scapula mobility: PNF mobilisation in 4 diagonals
- Restore physiological ARoM in shoulder girdle: AARoM (stick) in Flexion, Horizontal Abduction/Adduction
- Contracture's prevention: finger flexors passive stretching
- Preserve articular functionality: wrist, elbow, shoulder and scapula-thoracic mobilisation

Secondary objective:

- Gait pattern correction (assisted with right-side crutch): improvement of weight bearing and symmetrical stride length.

-Assisted stairs climbing: correcting wrong patterns (hip circumduction, reduced knee flexion and drop-foot)

## Therapy

- Scapular mobility (according Kabatt methodology): all four PNF diagonals are performed initially passively and later actively. Each diagonal (anterior elevation, posterior depression, posterior elevation, anterior depression) are performed 10 times and repeated 3 times.
- Active-Assistive UE joint mobilisation: the patient is in sitting or supine position. From this position, he is asked to hold a stick with both hands and perform separately: Shoulder flexion, extension, Abduction, Horizontal abduction, elbow flexion and extension). Every movement is also assisted by the therapist in order to perform support when required and for controlling the property of the movement. Every movement was performed 6 times and repeated for 3 sets. The patient reports that the movement is hard but he is able to perform it in a self-assisted way.
- Contracture's prevention: the patient is placed in sitting position. The position of the UE is liked described in Lewit methodology for performing PIR for the finger and carpal flexors. The pressure hand is applied on the volar aspect of the fingers and the other on the dorsal aspect of the forearm, as a support. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
- Preserve articular functionality: wrist, elbow, shoulder and scapulo-thoracic mobilisation are performed on the affected side in order to prevent the intrinsic joint restriction. The positioning and procedure is performed according Lewit methodology for every joint. In every joint where it was possible to perform the springing, the movement was repeated 8 times. Scapulo-thoracic passive mobilisation in side lying position is performed

in rotary direction (clockwise and anticlockwise) in order to maintain the scapular mobility. The rotations are performed 6 times in each direction.

- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.

The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

- Assisted stairs climbing: assisted by 2 therapists, the patient is instructed how to climb stairs safely with both legs leading. The stairs-climbing is trained with handle assistance and, later, with stick assistance.

The patient refers it to be hard but he has all the interest in being able to manage the task.

### **Results after session**

The patient refers an improvement of the UE mobility notoriously in the proximal joints. Despite the improvements, the patient is able to feel the onset of spasticity and its effects on the body.

### **Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. The ADL in which the patient should maintain the involvement of the affected side are all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Concerning the UE, the patient was given a stick, aiming to reproduce the AARoM exercises for the shoulder and elbow mobility, in order to be able to train in the room. These exercises should be repeated during



the afternoon at least twice a day. These exercises should be repeated during the afternoon at least twice a day, 3 sets per movement of 6 repetitions (sitting and supine: Flexion, Extension, Abduction, Horizontal abduction and adduction).

The patient is instructed to perform voluntary hip mobility in horizontal abduction and perform PIR method for the hip adductors in order to improve the RoM and reduce spasticity effects. This should be performed at least twice a day (in the afternoon) for 3 sets each time.

## 9<sup>th</sup> Session

### **Subjective**

Pain grading: No pain described

Feeling: The patient describes an intense sense of tiredness related to the ADL (forcing himself to do them with impaired side)

Medication: None

### **Objective**

Inspection:

- Left SI joint blockage (superior part), tested according Lewit's techniques in side-lying position
- Marked weakness of left UE extensors (mainly fingers and wrist) (1 and 3 out of 5)
- Plantar flexors spasticity and shortness
- Hip flexors (mono and bi-articular) shortness

### **Assessment**

The global patient's condition is improved but is conditioned by the tiredness.

The lower extremity shows the typical Wernicke-Mann positioning and functionality. Particularly when walking, the leg presents stiffness (straightening), foot in plantar flexion and the hip circumducted.

### **Plan**

Main objective:

- SI joint mobilisation according Lewit's technique
- Elbow and shoulder AROM improvement: AARoM into flexion, horizontal abduction, horizontal adduction, extension, abduction
- Pelvic mobilisation: PNF diagonals (all four)
- Symmetrical facial muscles activity: Facial muscles' motor control training.
- Hip flexors and plantar flexors stretching (mono and biarticular)

Secondary objective:

- Gait pattern correction: reduction of stiff-leg phenomenon and compensative hip circumduction

-Assisted stairs climbing: stimulating knee flexion and ankle dorsiflexion while climbing stairs.

## **Therapy**

- Blocked joints mobilisation: manual mobilisation of left SI joints (superior part) performed in side-lying position, according Lewit. The joint mobilisation is performed until the mobility is restored. The joint-play is restored in the end of the mobilization treatment.
- Active-Assistive UE joint mobilisation: the patient is in sitting or supine position. From this position, he is asked to hold a stick with both hands and perform separately: Shoulder flexion, extension, Abduction, Horizontal abduction, elbow flexion and extension). Every movement is also assisted by the therapist in order to perform support when required for controlling the property of the movement. Every movement was performed 6 times and repeated for 3 sets. The patient reports that the movement is hard but he is able to perform it in a self-assisted way.
- Pelvis mobilisation (according Kabatt methodology): all four PNF diagonals are performed initially passively and later actively. Each diagonal (anterior elevation, posterior depression, posterior elevation, anterior depression) are performed 10 times and repeated 3 times.
- Recover symmetrical functionality of the facial muscles: facing the mirror, the patient is asked to perform mimic expression involving all the responsible muscles (e.g. risorius, buccinator, mentalis, zygomatics, orbicularis orii). When the asymmetrical or inappropriate syncretism is observed, the patient is asked, first verbally and after by manual contact, to modify this behaviour. The contralateral side is used as a model to follow, when the activation happens in a correct form.
- Plantar flexors (biarticular) stretching: in supine with the feet out of the table, manual contact on the calcaneum of the treated side and with the other hand on the knee for maintaining it straight. The pressure is applied

with the volar part of the forearm of the arm supporting the heel, on the forefoot. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.

- Plantar flexors (monoarticular) stretching: in prone with the knee at 90° of flexion, manual contact on the forefoot of the treated side and with the other hand on the thigh for stabilizing the LE. The pressure is applied on the forefoot of the treated side with the therapist’s thenar and hypothenar. The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
- Hip flexors (biarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE’s hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower leg (above the ankle), in posterior direction (providing knee flexion). The amount of pressure applied is in relation of the barrier perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30” and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.
  
- Hip flexors (monoarticular) stretching: in supine with the treated side out of the table (from the same side). The pelvis is aligned with the lateral edge of the table and the contralateral LE’s hip is flexed in order to prevent the pelvic anteversion and the subsequent lumbar spine hyper-lordosis. The pressure is applied on the anterior surface of the lower thigh (at the height of the vastus medialis, but more central), in posterior direction (to the ground). The amount of pressure applied is in relation of the barrier

perceived (on the edge of the hard barrier), and it is pain-free. The stretch is maintained for 20 to 30" and repeated for 6 times per 3 sets. During the treatment it is observed progressive increasing of RoM in the direction of the stretch.

- Gait pattern correction (assisted with right-side stick): in standing, the patient is asked to shift his weight from left to right. Furthermore, he is placed in neutral position, achieving 50% of load of both legs and he is instructed to maintain this feeling when normally standing.

The patient is also explained the hip circumduction and knee stiffness phenomenon. Indeed, he is sensibilized during the slow walking to avoid the hip circumduction and to provide knee flexion during the swinging phase. The training of the stride length symmetry is performed on the parallels. On the path are placed some marks at the same distance between each other. The patient is asked to make correspond every mark with a step, supporting his weight on the parallels.

- Assisted stairs climbing: assisted by 2 therapists, the patient is instructed how to climb stairs safely with both legs leading. The stairs-climbing is trained with handle assistance and, later, with stick assistance.

The patient refers it to be hard but he has all the interest in being able to manage the task.

### **Results after session**

The patient refers an improvement of the UE mobility after the stretching. The correct walking ability improved and the patient is able to better control the knee flexion during the gate and to partially avoid the hip circumduction.

### **Recommendations**

During the ADL performance, the patient was instructed to involve also the affected side, and not to avoid its utilisation. Particularly during the gate, the patient must focus on slow walking in order to be able to concentrate on the proper movement performed by the lower extremity, as showed during the session. The ADL in which the patient should maintain the involvement of the affected side are

all these which involve the U and LE (e.g. taking objects, hair combing, bed mobility). Concerning the UE, the patient was given a stick, aiming to reproduce the AARoM exercises for the shoulder and elbow mobility, in order to be able to train in the room. These exercises should be repeated during the afternoon at least twice a day. These exercises should be repeated during the afternoon at least twice a day, 3 sets per movement of 6 repetitions (sitting and supine: Flexion, Extension, Abduction, Horizontal abduction and adduction).

The patient is instructed to perform voluntary hip mobility in horizontal abduction and perform PIR method on the hip adductors in order to improve the RoM and reduce spasticity effects. This should be performed at least twice a day (in the afternoon) for 3 sets each time.