



**Exercise**  
**despite limitation**

# Introduction

The formation of a pressure ulcer may represent a serious complication to the health of a wheelchair user. Due to its inconspicuous start, treatment is often underestimated in the initial stage of its development. What might first appear as minor redness or an abrasion may grow in just a few days to a deep, risky skin defect. Therapy for a more developed pressure ulcer is usually more demanding in terms of time and regimen limitations necessary for it to heal. In case that you start maintaining a strict alleviation regimen immediately after discovering the first signs of a pressure ulcer, the sore can heal within a matter of a few weeks.

For pressure ulcers localized on elbows, ankles or heels, the daily regimen need not be dramatically limited; it suffices to thoroughly eliminate pressure at a specific spot.

For pressure ulcers on sitting parts, i.e. those most frequently occurring, alleviation unfortunately means completely eliminating sitting in the wheelchair and lying in the supine position. If you miss this moment, the period necessary for treatment grows with every day, and in the most severe cases, it can lead even to long-term hospitalization, which certainly may not turn out favourably.

## Alleviate? What comes next?

There may be many reasons for putting off the initiation of an alleviation regimen. Frequent reasons include work that cannot wait or complicated searches for assistance and caregivers which comes with being confined to a bed. Of course, we respect these reasons, and we do not want to underestimate their importance. However, their placement over the needs of therapy mostly emerges from underestimating the situation and not realizing the consequences that can occur thereby. One can only repeat that if, you cannot afford two weeks of a limited regimen, it may occur that you will be forced to start treating a pressure ulcer that has much more widely spread, and then it may take several months to heal.

Another frequent reason comes from fears of being strapped to the bed, of loss of physical fitness and as a result, diminished independence. Immobilization itself, of course, brings many complications with it. Most of them can be prevented by simple regular exercise, which however must correspond to the established alleviation regimen of the affected area.

Certain patients on the contrary replace an alleviation regimen with doing nothing, which can significantly complicate their return to active life. A lack of regular movement activities leads to diminished physical fitness, growing spasticity may occur, as well as neuropathic pain or the pain of a body „lying down too long“. All of this fundamentally slows the return to an active life after healing the pressure ulcer, and can also limit independence in ordinary daily activities.

→ In solving these very problems, we would like to provide assistance through this brochure.



# How to navigate through the brochure

- 1. We have divided individual exercises into chapters based on applied **positions**:

**Position lying prone** ←

page 6–20  
exercise 1–18

**Position lying on the side** ←

page 21–27  
exercise 19–28

**Position kneeling on all fours** ←

page 28–35  
exercise 29–36

**Position sitting diagonally** ←

page 36–43  
exercise 37–46

**Position in a high kneel** ←

page 44–49  
exercise 47–52

- 2. Always at the start of the chapter, make sure the positioning is correct, or consider the pitfalls that you may encounter when exercising in the given **position**.

- 3. Then you can select the **exercise** according to available aids (p. 5) or your own needs and capabilities when exercising.

- 4. **Notes** supplement the basic positioning and assist you in performing the exercise correctly.



→ supplemental information



→ recommendations or warnings





# Basic positions when exercising with a pressure ulcer and their selection

The main criterion in selecting an exercise position is localization of the pressure ulcer:

## Bed sores on the sacrum and ischial tuberosities ←

### appropriate exercise positions:

- on the side
- sitting diagonally
- lying prone
- on all fours
- in a high kneel



### inappropriate exercise positions:

- lying in the supine position
- **any kind of sitting is strictly prohibited!**

## Bed sore in the area of greater trochanter of the femur, i.e. on the side of the hip ←

### appropriate exercise positions:

- in the supine position (inspiration for this can be found in other brochures) supine?
- lying prone?
- on all fours
- in a high kneel

### inappropriate exercise positions:



- on the side
- sitting diagonally
- sitting in the wheelchair → during which pressure occurs at the injured place upon contact with the mudflap or side panels of the wheelchair.

## Bed sores on the spine ←

### appropriate exercise positions:

- on the side
- sitting diagonally
- lying prone
- on all fours
- in a high kneel

### inappropriate exercise positions:



- lying in the supine position
- sitting with back support, i.e. even in the wheelchair



# General rules for exercising

## For the exercise to have the right effect, it is good to prepare for it a bit: ←

- you should not eat too much at least an hour before exercise
- select a time when you are capable of fully concentrating on exercising.

## Divide exercising into three parts: ←

### Warmup (around 5-10 min.)

Move around using light movements, rotate the shoulders and do some light stretching.

### Main part (30 min)

Focus on fitness training and strengthening exercises, repeat each exercise 8-15 times in 2-3 series.



Quality of the movement is important. If you lose the quality of your positioning, when performing a higher number of repetitions, do the exercise fewer times.

### Conclusion (5-10 min)

Loosening up and slow stretching and holding uttermost positions for a short time.

This part is very important for regeneration of muscles so for you, the next exercise session would be a welcomed change during the alleviation regimen and not suffering.

## It is appropriate to adjust the intensity of exercises individually according to your needs or difficulties. ←

- If something is hurting you when exercising and it does not just concern tired muscles, it is good to try adjusting the position or decrease the range of motion.
- If the pain persists, it is good to seek consultation on performing a given exercise.



Our tip: If you don't have the opportunity for personal consultation with a physical therapist, try to agree with one on sending photos or videos of your exercise and consult on them with the physical therapist via e-mail.

## Concentrate on what you're doing ←

- **Moving back is also an exercise**, so it is performed consciously and slowly.
- For exercising, it is best to keep the **back straightened at all times and also hold the head extended with it.**
- **Correct shoulder position**

For all exercises involving the arms, there is usually a tendency to pull the shoulders up to the ears and press them forward. Often affiliated with this is greater rounding of the thoracic spine. For this situation we have the well-worn but favorite phrases of physiotherapists „**shoulders away from the ears**“ and „**wide shoulders**“.



## Aids

### Dumbbells, stretch bands (so-called TheraBand) ←

Select the intensity (dumbbell weight, band resistance) so that you would not have to disrupt exercising due to high fatigue or pain, but for you to feel a reasonable load when exercising. Also excessive is any load during which you do not maintain correct positioning of the body.

### It is possible to hold the TheraBand a few ways:

- tie a loop through which the hand is placed (1),
- loosely wind over the palm (2).

**!** Be careful, if the TheraBand is repeatedly wound and unwound, it will wear out quicker and can snap earlier.



### Flowin® pads ←

These allow a sliding movement combined with limbs in support, they can be replaced e.g. by two incontinence underlays placed on each other by the waterproof side. If exercising on a hard floor (parquet, tile, etc.), you can use wool gloves or sleeves that enable sliding along the floor.

### Positioning aids ←

For supporting the legs (lying on the side) or the pelvis (sitting on heels), you can use a folded quilt, blanket or pillow. Select the size so that your position would most correspond to the photograph of the given exercise, and so that it would not be unpleasant or irritating for you.



# Position lying prone

This involves a stable position requiring no special positioning.

## Basic positioning in the position lying prone:

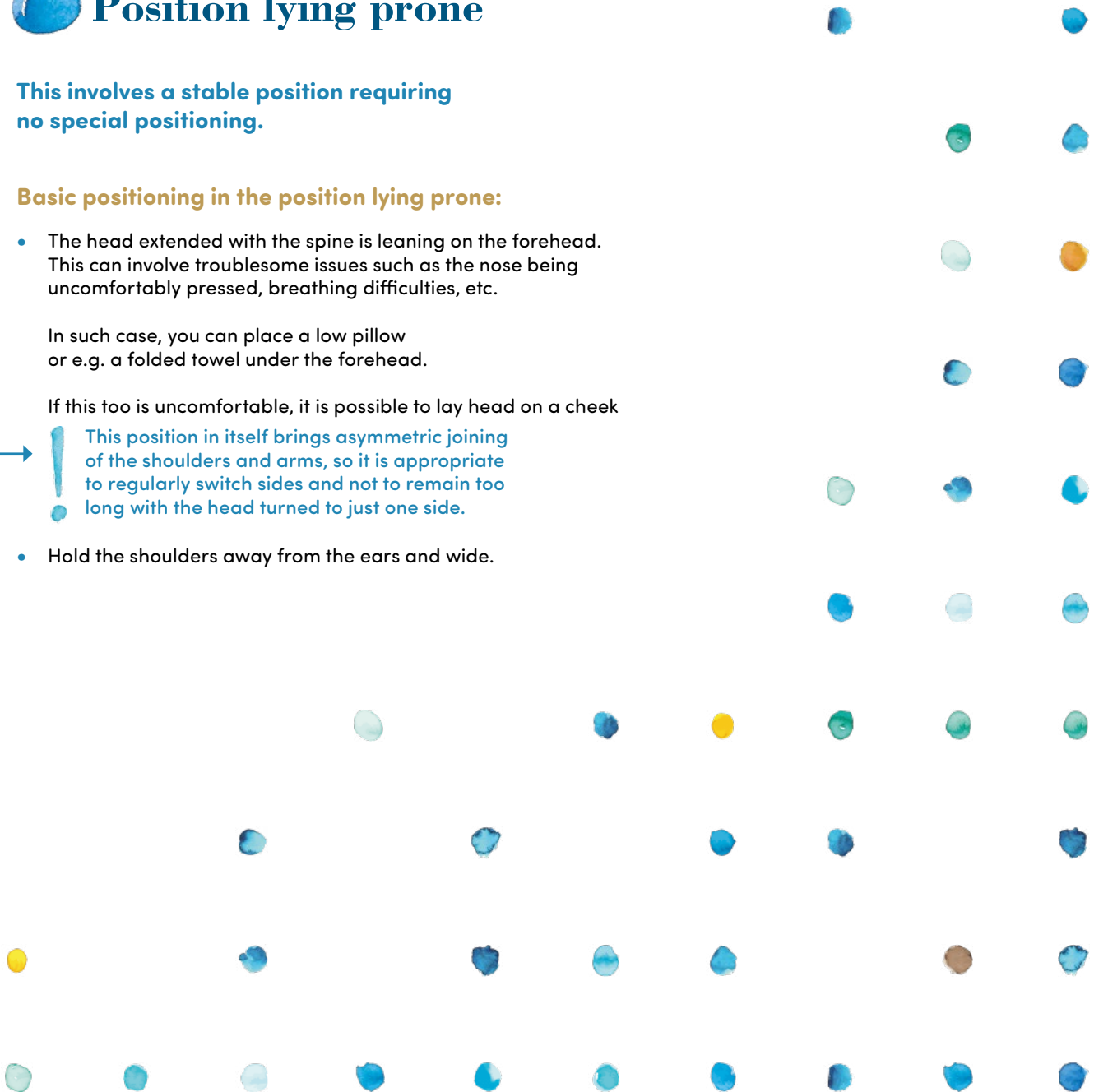
- The head extended with the spine is leaning on the forehead. This can involve troublesome issues such as the nose being uncomfortably pressed, breathing difficulties, etc.

In such case, you can place a low pillow or e.g. a folded towel under the forehead.

If this too is uncomfortable, it is possible to lay head on a cheek

! This position in itself brings asymmetric joining of the shoulders and arms, so it is appropriate to regularly switch sides and not to remain too long with the head turned to just one side.

- Hold the shoulders away from the ears and wide.



## Exercise 1

### Starting position:

Lying prone, arms stretched upwards, best held actively above the mat, TheraBand in both hands, in the middle attached e.g. to the headboard of the bed or other fixed point in the area. (3)

### Performing the movement:

From the outstretched position, draw in and bend your elbows to the body against the resistance of the TheraBand. (4)

### Variation:

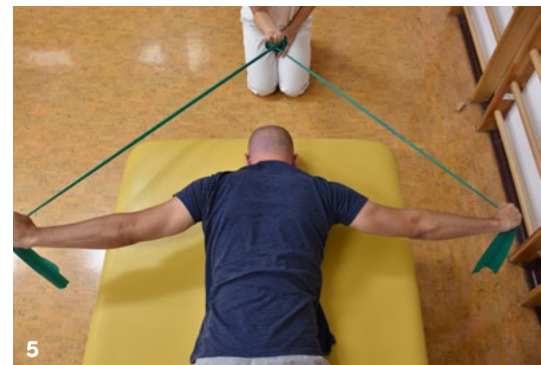
From the outstretched position, you can perform the movement right to having the arms stretched out wide out to the side with elbows extended. (5)

You can also perform this variant of the exercise without tying the TheraBand to the headboard. Just hold both ends of the TheraBand and pull them to the sides.

### Notes:

The head is leaning on the forehead. The shoulders mostly tend to pull towards the ears and press into the mat, so during the entire movement, watch for the position of the shoulders away from the ears and pulled wide.

 Moving back is also an exercise, so it is performed consciously and slowly.





## Exercise 2

### Starting position:

Lying prone, arms straight and tight to the body, held so that the TheraBand tight between them does not touch the buttocks, and would remain slightly above them throughout the exercise. (6)



### Performing the movement:

From the position tight to the body, stretch both arms out sideways against the TheraBand resistance. (7)

### Variation 1:

You can perform the same exercise in smaller range of movement at a rapid frequency. (8)

### Variation 2:

From the position tight to the body, the movement can be made to the outstretched position by only one arm. If possible, the other hand is not leaning on the hip but is actively held in space. (9)



### Notes:

The head is leaning on the forehead. The shoulders mostly tend to pull towards the ears, so during the entire movement, watch for the position of the shoulders away from the ears and pulled wide.



## Exercise 3

### Starting position:

Lying prone, arms stretched out to the side and elbows bent so that the forearms hang loosely from the bed, thumbs facing towards the space under the bed. (10)

Position the arm so that it forms a right angle with the torso. During the course of the movement, this angle should not change, the arms and elbows should not slide along the mat.

### Performing the movement:

Stretch both arms out at the elbows. (11)

### Variation 1:

If it is not possible to lower both forearms from the bed simultaneously, you can perform the exercise first with one arm and then the other. The limb not being exercised rests freely alongside the body. (12)

**In this asymmetric variant, you must watch the position of the entire body, when stretching the arm out at the elbow, the torso and shoulders should not turn over or lean to one side of the outstretched arm.**

**The head may have a tendency to bow, again it is important to keep it in line with the entire spine.**

### Variation 2:

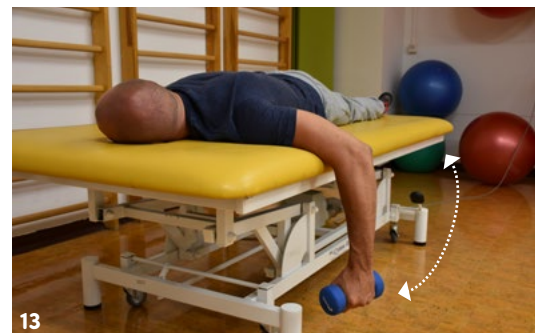
The forearm may be rotated so that the palm faces under the bed. (13)

### Notes:

The head is leaning on the forehead or turned to the side.

The shoulder of the limb that is stretched at the elbow has a greater tendency to fall and press into the bed.

**Again, it is crucial to keep the shoulders „wide“, best with no contact at all with the mat.**



## Exercise 4

### Starting position:

Lying prone, arms stretched out to the side and elbows bent so that the forearm hangs loosely from the bed. (14)

Position the arm so that it forms a right angle with the torso. During the course of the movement, this angle should not change, the arms and elbows should not slide along the mat.

### Performing the movement:

Rotate both arms at the shoulder, turn the forearms with the dumbbell first towards the head – outward rotation at the shoulder (15), then return to start position and turn towards the legs – inward rotation at the shoulder. (16)

### Notes:

The head is leaning on the forehead or turned to the side.

**i** For maintaining the correct shoulder position, the inward rotation is the harder of the two, when the forearm raises towards the legs and the shoulders tend to press into the mat. Throughout the exercise, try to maintain the shoulders in the position in which they are found at the end of the movement in the outward rotation.





## Exercise 5

### Starting position:

Lying prone, arms stretched out to the side, elbows straight, palms with dumbbells pointing to the floor. (17)

### Performing the movement:

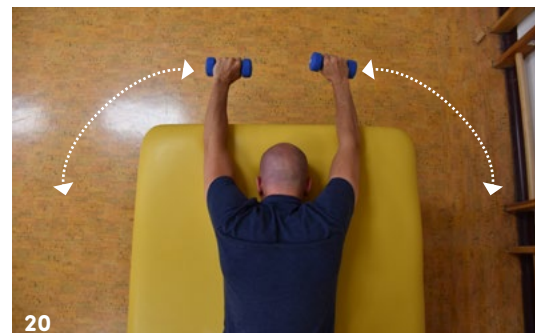
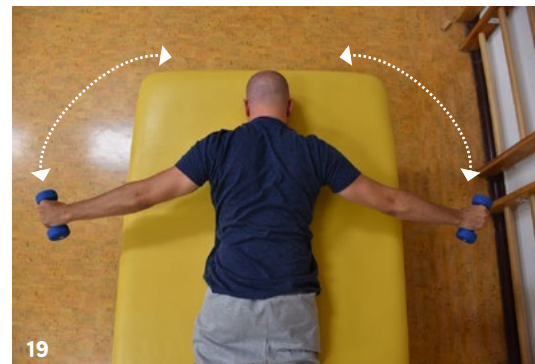
Make small backward circles with your arms. (17)

Movement should only come from the shoulders; the elbows remain outstretched throughout the exercise.

### Notes:

The head is leaning on the forehead or rotated to the side.

- i** The shoulders tend to press into the mat. Throughout the exercise, try to keep them just above the mat.



## Exercise 6

### Starting position:

Lying prone, arms alongside the body, palms with dumbbells pointing to the floor. (18)

### Performing the movement:

Lift both arms off the bed and in an arching motion, move them together over the head and back again. (19, 20)

### Notes:

The head is leaning on the forehead. Movement should only come from the shoulders; the elbows remain outstretched throughout the exercise. Throughout the exercise, try to keep the arms just above the mat, with no contact with the bed.

**!** This exercise will be difficult if not impossible for those of you who have a stiff thoracic spine, enlarged thoracic kyphosis or limited range of the movement in the shoulder joints. The exercise uses the maximum ranges in the shoulder and can be painful. So make the movement as best you can at this time. If your shoulders hurt, skip this exercise.



## Exercise 7

### Starting position:

Lying prone, torso raised supported by the forearms, shoulders away from the ears, actively lean with the entire forearm to the wrist, straighten the neck and tuck the chin in towards the neck. (21)

### Performing the movement:

Assume this position and hold it for several breaths in and out, then release.

### Variation 1:

Slight shifting of weight from one side to the other side, lift one forearm from the mat, briefly hold the position on one arm. (22)

### Variation 2:

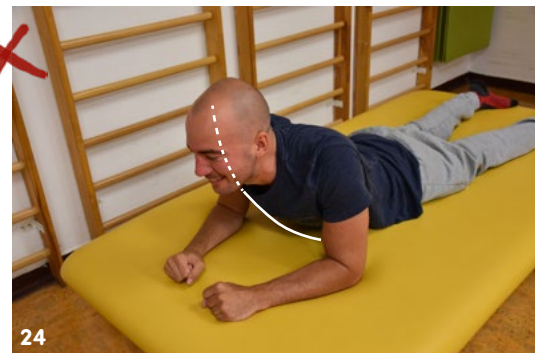
Alternating the supporting arms at a fast pace, i.e. „walking“ the forearms in place by slightly swinging the torso while trying to keep the positioning of the torso and shoulders as stable as possible. (23a/b)

### Notes:

When supporting, the arms tend to peel the wrists back and balance only on the elbows. For sufficient activity of the entire arm and shoulder, it is vital to keep the entire forearm firmly supporting (including the wrist).

The head tends to droop between the shoulders, while this mostly makes the chin stick out forward. So this exercise would be performed actively and the person only passively „does not hang“ into the shoulders (24), you must keep the shoulders away from the ears, extend the neck with chin tucked into the throat.

**I** In both variations of the exercise, it is important to try to engage as much of the torso as possible. Muscles of the torso and shoulder girdle try to keep the shoulders level so that the upper half of the torso would droop towards the mat as little as possible.



## Exercise 8

### Starting position:

Lying prone, the head extended with the spine is leaning on the forehead. The legs and lower torso are positioned on a soft mat. The upper torso, arms and head are on the floor or other sliding surface. The arms are stretched upwards. The forearms are leaning on sliding pads. (25)

### Performing the movement:

Pull the arms along the floor towards the body under the level of the shoulder joints supported by the forearms. (26)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not moved forward and shoulders pulled away from the ears.



## Exercise 9

### Starting position:

Leaning on the forearms, the legs and lower torso are positioned on a soft mat. The upper torso and arms are on the floor or other sliding surface. The elbows are slightly in front of the level of the shoulders. The forearms are supported on sliding pads.

### Performing the movement:

Slide the mats along the floor like you want to draw a circle. You can circle in both directions. (27a)

### Variation 1:

Lean into the sliding mat and circle using only one forearm. (27 b)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not moved forward and shoulders pulled away from the ears.

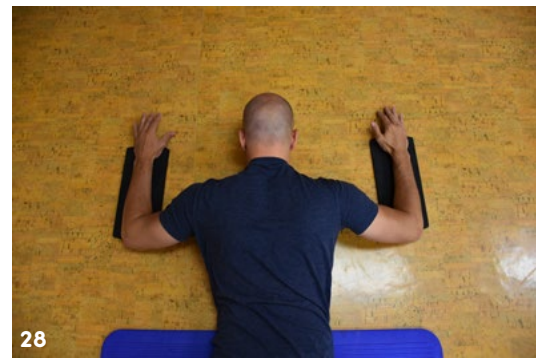




## Exercise 10

### Starting position:

Lying prone, the head extended with the spine is leaning on the forehead. The legs and lower torso are positioned on a soft mat. The upper torso, arms and head are on the floor or other sliding surface. The arms are extended and bent at the elbows at a right angle. The forearms are leaning on sliding pads. (28)



### Performing the movement:

Pull the forearms along the floor towards the body under the level of the shoulder joints supported by the forearms. (29)

### Variation:

By changing the angle in the shoulder in the start position, you activate various parts of muscles of the shoulder girdles and torso. (30a/b)



### Notes:

It is important throughout the entire movement to keep the spine straight, the head not moved forward and shoulders pulled away from the ears.



## Exercise 11

### Starting position:

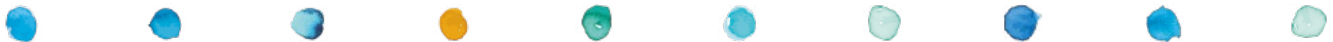
Lying prone, the head extended with the spine is leaning on the forehead. The legs and lower torso are positioned on a soft mat. The upper torso, arms and head are on the floor or other sliding surface. One arm is extended, the other is located alongside the body and bent at the elbow. The forearms are leaning on sliding pads. (31)

### Performing the movement:

Lean on your forearms and slide the elbows towards the body under the level of the shoulder joints. (32)  
Then slide the originally extended arm along the body towards the legs and bend the elbows. Fully extend the arm that was originally bent at the elbow. (33)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not moved forward and shoulders pulled away from the ears.





## Exercise 12

### Starting position:

Leaning on the forearms, the legs and lower torso are positioned on a soft mat. The upper torso and arms are on the floor or other sliding surface. The elbows are slightly in front of the level of the shoulders, fingers facing each other. One forearm is leaning into the sliding mat on the floor. (34)

### Performing the movement:

Slide the mat along the floor in front while extending the elbow. (35)

### Variation 1:

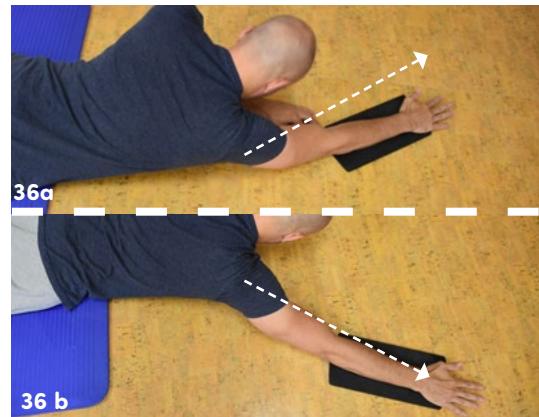
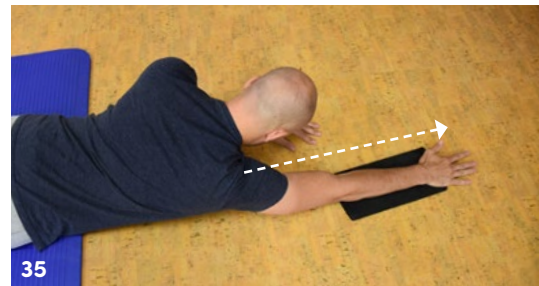
You can slide the mat in several directions – with extension of the elbow through the center of the body or diagonally to the side. (36a/b)

### Variation 2:

You can slide the mat to the side with elbow bent. (37)

### Notes:

It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out, and shoulders pulled away from the ears.



## Exercise 13

### Starting position:

Lying prone on a treatment table or bed, the head and functioning part of the torso protrudes from the treatment table or from the bed, the plegic (paralyzed) part of the torso remains propped up on the treatment table, the arms are supported by the palms in the sliding mats on the floor. The palms are located under the shoulders. (38)



38

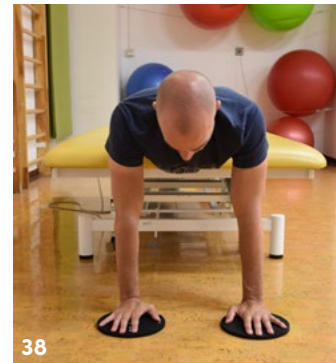
### Performing the movement:

Slide the sliding mats forward along the floor.

The palms remain at shoulder width during the entire movement. *Keep the elbows extended.* (39)

### Variation:

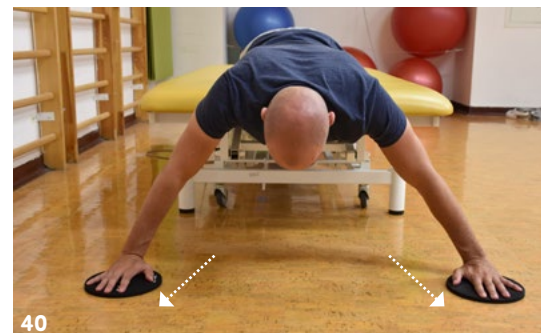
By changing the direction of movement, you activate various parts of the shoulder and torso muscles. (40)



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39



40

### Notes:

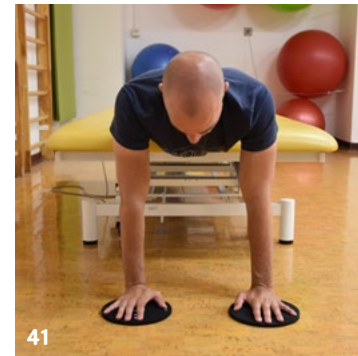
It is important throughout the entire movement and *mainly during the return movement* to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.



## Exercise 14

### Starting position:

Lying prone on a treatment table or bed, the head and functioning part of the torso protrudes from the treatment table or from the bed, the plegic (paralyzed) part of the torso remains propped up on the treatment table, the arms are supported by the palms in the sliding mats on the floor. The palms are located under the shoulder joints. (41)



### Performing the movement:

Slide the sliding mats forward along the floor to the side. Keep the elbows bent like for doing pushups during the course of the movement. (42)

### Notes:

It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.



## Exercise 15

### Starting position:

Lying prone on a treatment table or bed, the head and functioning part of the torso protrudes from the treatment table or from the bed, the plegic (paralyzed) part of the torso remains propped up on the treatment table, the arms are supported by the palms in the sliding mats on the floor. The palms of both arms are found under the level of the shoulders. The elbows are extended. (43)

### Performing the movement:

Slide the sliding mat in an arch along the floor to the other side - i.e. to the left and back. Leave the elbows extended. (44)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not moved forward and shoulders pulled away from the ears.





## Exercise 16

### Starting position:

Lying prone on a treatment table or bed, the head and functioning part of the torso protrudes from the treatment table or from the bed, the plegic (paralyzed) part of the torso remains propped up on the treatment table, the arms are supported by the palms in the sliding mats on the floor. The palms are located under the shoulders. (45)

### Performing the movement:

Slide the arms along the floor diagonally from each other (one forward and to the side, the other towards the treatment table and to the side) and back. After returning to the start position, the direction of the arms switches up and each arm performs the opposite movement. The elbows remain outstretched throughout the exercise. (46a/b)

### Notes:

It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out, and shoulders pulled away from the ears.



## Exercise 17

### Starting position:

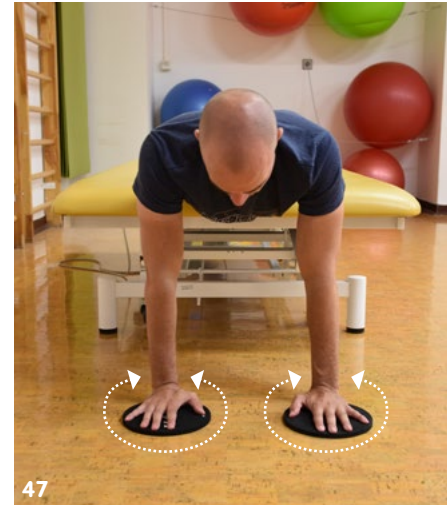
Lying prone on a treatment table or bed, the head and functioning part of the torso protrudes from the treatment table or from the bed, the plegic (paralyzed) part of the torso remains propped up on the treatment table, the arms are supported by the palms in the sliding mats on the floor. The palms are located under the shoulders. (45, 47)

### Performing the movement:

Slide the sliding mats along the floor like each one wanted to draw a circle. The elbows remain extended. Circles can be performed in both directions. The arms can perform circles in the same or opposite direction. (47)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not moved forward and shoulders pulled away from the ears



## Exercise 18

### Starting position:

Lying prone on a treatment table or bed, the head and functioning part of the torso protrudes from the treatment table or from the bed, the plegic (paralyzed) part of the torso remains propped up on the treatment table, the arms are supported by the palms in the sliding mats on the floor. The palms are found under the shoulders, one shifted slightly forward, the other slightly to the rear. (48)

### Performing the movement:

Switch the position of the hands in rapid succession. (49)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.



## Position lying on the side

This is a less stable position, when the person is lying just on the lower shoulder and hip.

The body when unstable tends to „secure“ itself by leaning more towards the back, or on the contrary towards the stomach. If there is active mobility of the torso, the torso muscles are automatically activated in this position. Exercising on the side is therefore a bit more all-embracing and complex than exercising lying prone or back. However, it also places greater demands on maintaining the correct position over the course of the exercise. In case of instability, the automatic effort of supporting stability will appear by movement of the head or arms. **It is important to always keep this in mind and watch a bit more the positioning of the head and shoulders.**

### Basic positioning in the position lying on the side (50)

- The head and the torso are in one plane.
- The head is supported from underneath so that it is extended with the spine.
- The size of the mat under the head is individual and depends on the width of the shoulders.
- On the torso, it is necessary to position the natural curve of the spine.
- Beware of excessive rounding of the thoracic spine and much sagging in the lumbar spine.
- The arm below lies in front of the body, the arms tighten with the torso at roughly a right angle, and the elbows are also bent at a right angle.

**i** If this positioning in the shoulder or elbow is not possible, try to approximate it so that nothing hurts, and it would be possible to let the arm relax loosely.

- The legs lie bent in front of the body to keep stability, and thereby help positioning the aforementioned lumbar spine.

**i** It is good to place a small pillow between the knees. This will keep them from being pressed together. The set position will also be gentler on the upper hip joint.

The knee should be supported from beneath so that it is in line with the hip joint.



## Exercise 19

### Starting position:

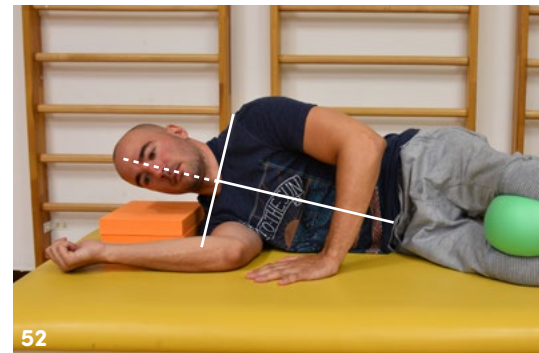
Lying on the side, the arm above is leaning with the entire area of the palm in front supporting the body. (51)

### Performing the movement:

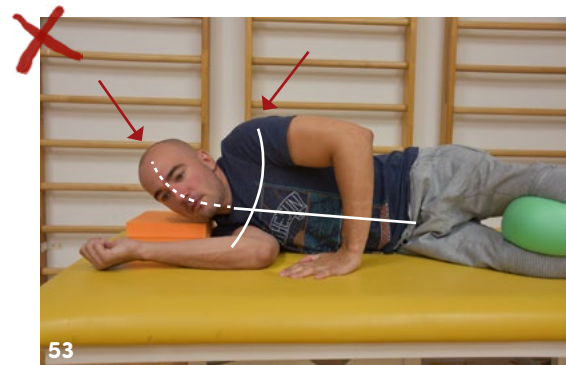
Lean into the lower shoulder and elbow as well as the palm of the arm above. Lift the head together with extended entire spine. (52)



51



52



53

### Notes:

It is important to keep the head in line with the extended spine. During this exercise, the upper torso should be activated in cooperation with the muscles of the shoulder girdle and neck muscles.

**!** If this cooperation does not occur, the head is then raised only by the trapezius muscle, which is usually overburdened already during ordinary activities, and it is not necessary to painfully overburden it even more. This exercise performed in the wrong position also does not utilize the activity of important back muscles. (53)





## Exercise 20

### Starting position:

Lying on the side, the arm above holds the dumbbell with extended elbow resting on the side. (54)

### Performing the movement:

Lift the extended arm above towards the ceiling until outstretched sideways. (55)

### Notes:

During movement of the arm above, the position becomes less stable, and the limb tends to balance everything. Meanwhile, the original direction is usually not maintained, and the movement moves more forward or behind the body.

**i** Try to avoid these mistakes and keep the torso firm and maintain the arm movement.

## Exercise 21

### Starting position:

Stretch the arm above forward and level in front of the body. (56)

### Performing the movement:

Stretch the arm above forward and level in front of the body. (57)

### Notes:

A frequent error is movement of the entire torso simultaneously with the moving arm.

**i** The torso should remain motionless throughout the exercise, movement comes only from the shoulder.



54



55



56



57





## Exercise 22

### Starting position:

Lying on the side, the arm above holds the dumbbell and is outstretched forward with straight elbow in front of the body. (58)

### Performing the movement:

Lift the arm above and then, simultaneously with rotation of the torso, continue backwards and then return. (59)

### Variation:

The same movement can be performed by the arm while maintaining stability of the torso, without its simultaneous rotation. (60)

### Notes:

In this exercise, the arm should move throughout the movement together with the torso, the movement of the arm and the torso should be smooth.



## Exercise 23

### Starting position:

Lying on the side, the arm above holds the dumbbell and is raised slightly above the side with elbow extended. (61)

### Performing the movement:

With the arm above, make smooth, fluid circles to the rear, or you can make figure eights in the air, lying figure eights, write numbers in the air and other variations. (61)

### Notes:

The torso should remain stable, firm, movement of the arm comes only from the shoulder. The shoulder of the exercising limb is kept away from the ear throughout the exercise. The larger the circles, the more difficult the position in terms of stability, and the torso, or possibly the arm below, is forced into greater activity.



## Exercise 24

### Starting position:

Lying on the side, the arm above holds the dumbbell, with bent elbow it is freely released to the mat. (62)

### Performing the movement:

Lift the forearm of the arm above towards the ceiling, the arm remains bent at the elbow in a right angle, and the elbow remains in contact with the side. (63)

### Notes:

It is important for the elbow to remain in contact with the side, often the elbow has the undesirable tendency to stretch upwards too.



## Exercise 25

### Starting position:

Lying on the side, the arm above is bent at the elbow, and a TheraBand is wrapped around the palm. (64)

### Performing the movement:

Stretch the arm forward against the resistance of the TheraBand. (65)

### Notes:

The torso should remain stable, firm, movement of the arm comes only from the shoulder.



## Exercise 26

### Starting position:

Lying on the side, the arm above is extended towards the ceiling, one end of the TheraBand is tied off behind the body, the other end is wrapped around the palm of the arm above. (66)

### Performing the movement:

The arm above along with the torso moves forward until outstretched against the resistance of the TheraBand. Stretch the TheraBand forward by outstretching the arm, simultaneously rotate forward also with the torso. (67)

### Notes:

Throughout the exercise, keep the shoulders away from the ears and spread widely.



## Exercise 27

### Starting position:

Lying on the side, the arm above is extended towards the ceiling, one end of the TheraBand is tied off behind the head, the other end is wrapped around the palm of the arm above. (68)

### Performing the movement:

With the arm, go against the resistance of the TheraBand until close to the body, keep the elbow extended, rotate the palm forward, lead the movement of the arm following the little finger. (69)

### Notes:

Throughout the exercise, keep the shoulders away from the ears and spread widely. The torso remains stable, without rotation.



## Exercise 28

### Starting position:

Lying on the side, both arms are extended forward with elbows straight, both have a TheraBand wrapped around the wrists. (70)

### Performing the movement:

Extend the arm sideways up towards the ceiling against the resistance of the TheraBand. Keep the arm below at the mat, both elbows are extended throughout the exercise. (71)

### Variation:

The torso also rotates along with the arm above. (72)



### Notes:

Throughout the exercise, keep the shoulders away from the ears and spread widely.





## Position kneeling on all fours

This position is now relatively difficult for maintaining the correct positioning. This especially applies to those who have most torso muscles paralyzed, it may be difficult to maintain stability simultaneously with optimum positioning of the limbs.

### Basic positioning on all fours (73)

- The palms are leaning directly under the shoulders, their entire area is on the mat, fingers press into the mat evenly, the thumbs and little fingers lie on the mat.
- The knees are placed under the hips and are positioned farther apart than the heels.
- The arms and the thighs close to form a general right angle with the torso.
- The elbows are outstretched but not bent.
- Shoulders away from the ears!
- The spine should be straightened, without accented bending or bowing.
- The head is held extended with the spine.
- The chin is not thrust forward, but is slightly pulled back towards the neck.



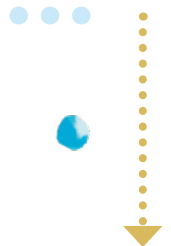
### A variation of this position is kneeling on all fours leaning on the forearms (74)

This is more advantageous for certain exercises. It is also appropriate for those whose torso muscles don't work. It is more stable in comparison with leaning on extended arms, but it remains a sufficiently difficult exercise position.

A key advantage in this position is also the stretching of the thoracic spine.

Even in this position it applies that

- the shoulders must be kept away from the ears,
- the arms and thighs are perpendicular to the mat,
- the head is extended with the spine, which in this position means wide and down towards the mat.



**i** If your lumbar spine becomes very curved when kneeling on all fours and you have cannot actively correct the position with the torso muscles, you can use further variations:

### Variation 2:

It is possible to place e.g. a pillow or rolled mat under the thighs and pelvis. (75) By this positioning, it is also possible to reduce strain of the arms, if full support causes pain to the wrists.

### Variation 3:

Another option upon increased lumbar spine curvature is supporting the torso under the abdomen e.g. with a large ball. (76)



## Exercise 29

### Starting position:

Kneeling on all fours (any of the stated variants), palms are placed farther apart than shoulder-width. (77)

### Performing the movement:

Tilt the torso and head down to the floor to the pushup position, keep the spine straight, bend the elbows at a right angle, both elbows and both shoulders are in a straight line, the elbows are aiming directly to the sides as wide as possible. (78)

### Notes:

Pay attention to how the head is held, it has a tendency to lean out with the chin extended. The elbows should not tilt towards the body, it is necessary to push them out as wide as possible.



## Exercise 30

### Starting position:

Kneeling on all fours in a deeper forward bend, with elbows bent at a right angle. (79)

### Performing the movement:

Lighten the resistance of one arm and slide the palm along the mat diagonally to the front and side. (80)

Do the same with the other arm in the same manner. (81)

Gradually return both arms back to the start position. (82)

### Notes:

Pay attention to how the head is held, it tends to tilt with extended chin. The elbows on the bent limbs should not tilt towards the body, it is necessary to push them out as wide as possible. During asymmetric leaning on one extended and one bent limb, the body has a tendency to droop to the ground on the side of the extended elbow. Try to constantly maintain the axis of the shoulders level and keep the shoulders away from the ears.





## Exercise 31

### Starting position:

Kneeling on all fours (any of the variants stated in the beginning of the chapter). (83)

### Performing the movement:

Do a triceps pushup – direct the elbows to the back towards the heels. (84)

### Notes:

Pay attention to how the head is held, it tends to tilt with the chin extended. The elbows on the bent limbs should not aim away from the body, they must be kept close to the body. When moving from the down position to the start position during the pushup, it is important to lean the force of the entire palm into the mat, be sure not to let the thumbs peel away. It is also necessary to press the elbows actively to the rear and shoulders away from the ears.



## Exercise 32

### Starting position:

Kneeling on all fours leaning on the forearms. (85)

### Performing the movement:

Bring the weight to the back towards the heels. (86)

### Notes:

Pay attention to the position of the head, it tends to tilt with the chin extended. Throughout the exercise, you must keep the forearms leaning along their entire length from the elbows to the wrists. The same way throughout, keep the shoulders away from the ears.



## Exercise 33

### Starting position:

Kneeling on all fours leaning on the forearms. (87)

### Performing the movement:

Lean the left arm on the palm and rise to straighten the elbow. (88)

In the same manner, straighten also the right arm. (89)

Gradually return both arms back to support on the forearms. (90)

### Notes:

Pay attention to how the head is held, it tends to tilt with the chin extended. Keep the shoulders pulled away from the ears. When leaning on the palm, actively hold the entire palm down, watch for peeling away of the thumbs and the entire thumb-side of the palm.



## Exercise 34

### Starting position:

Kneeling on all fours leaning on the forearms, the TheraBand wrapped around the palms of both hands. (91)

### Performing the movement:

With one limb, remain leaning on the forearm, and extend the other to the side against the resistance of the TheraBand. (92)

### Variation:

Raise the arm bent at the elbow against the resistance of the TheraBand up towards the ceiling. (93)



### Notes:

This exercise is very demanding in maintaining the torso. It will be easier for those able to apply multiple torso muscles.



The aim is to keep the torso as firm as possible, without movement to the sides or without drooping onto the supporting limb.



If, in light of the severity of your disability, you cannot handle holding the torso well, it is better not to perform this exercise.



## Exercise 35

### Starting position:

In the position on all fours, one arm is leaning on the palm into the sliding mat placed on the floor. The palms are found under the shoulder joints or slightly in front of the level of the shoulders. (94)

### Performing the movement:

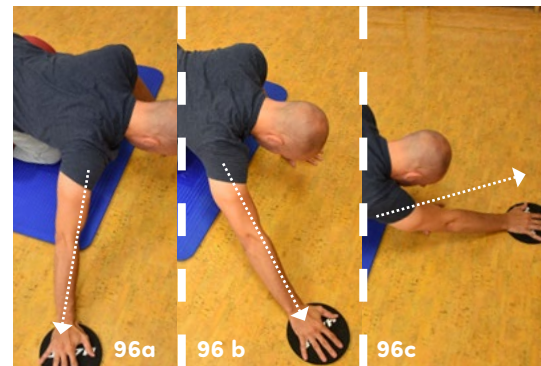
Slide the sliding mat forward along the floor. (95)

### Variation:

You can slide the mat in several directions – to the side, diagonally to the front, or through the center of the body. (96a/b/c)

### Notes:

It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.



## Exercise 36

### Starting position:

In the position on all fours, one arm is leaning on the palm into the sliding mat placed on the floor. The palms are found under the shoulder joints or slightly in front of the level of the shoulders. (97)

### Performing the movement:

Slide the mats along the floor like you want to draw a circle. You can circle in both directions. (97)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.



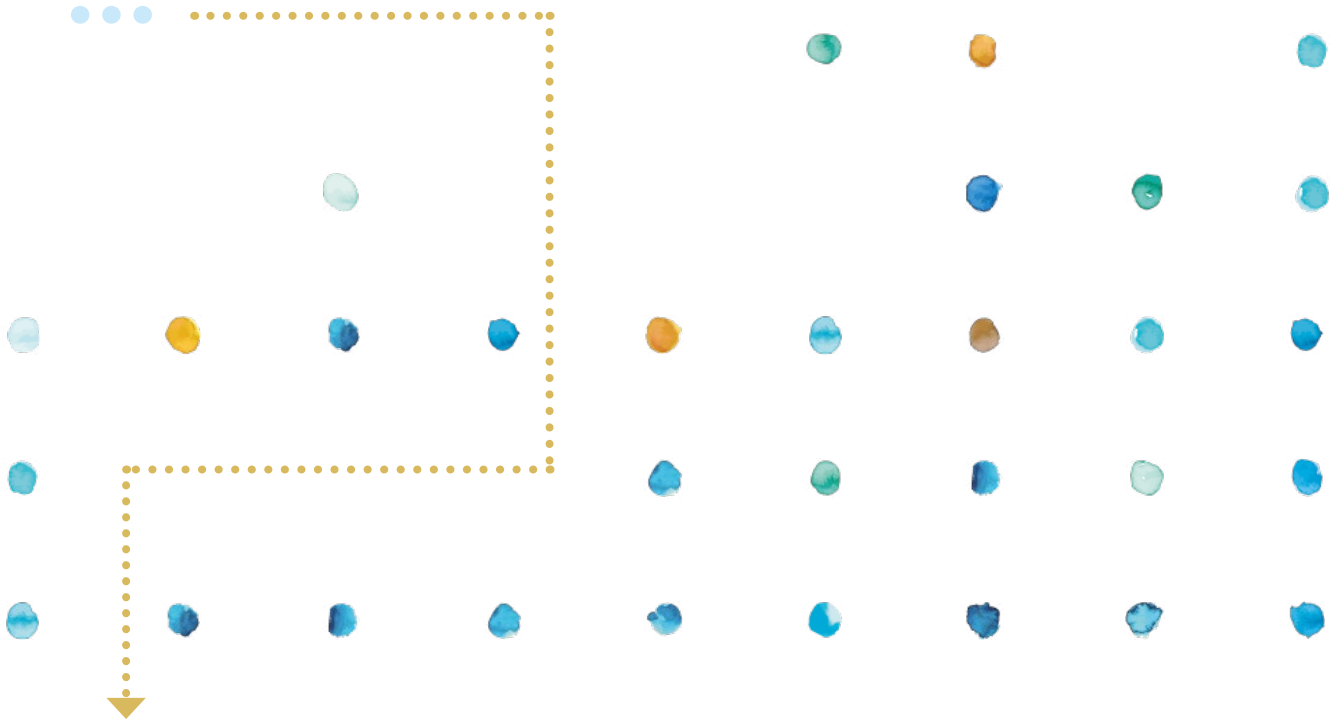


## Position sitting diagonally

Diagonally seated is the most difficult position in which to maintain stability. This mainly depends on interconnecting the work of the supporting arm and the torso. The more the torso muscles are active, the more surely the position can be held and with a better straightened torso.

### Basic positioning sitting diagonally

- The body is lying on the side, leaning on one forearm, or in a higher variant the support is only by the palm and the elbow is extended.
- In both variants, the head should be extended with the entire spine, i.e. both at a slant. (100)
- Both shoulders away from the ears.
- On the shoulder below there is frequently a tendency to rather passively hang (101), so it is necessary to keep right in mind the activity of muscles of the shoulder girdle.
- When leaning on the forearm, the load should be distributed evenly on the entire elbow, the palm and fingers should be loosely lying above the mat.
- The torso is positioned as though the back were leaning on a wall. (100)
- Watch out for twisting the shoulders towards the pelvis so as not to „wring“ the torso. (101)



- Options of positioning legs vary:

- If the plegic limbs are positioned so that the one is bent in front of the body and the one above is slightly bent and placed more towards the rear, better straightening of the torso will occur by the weight of the rear limb and pulling at the hip. (98)

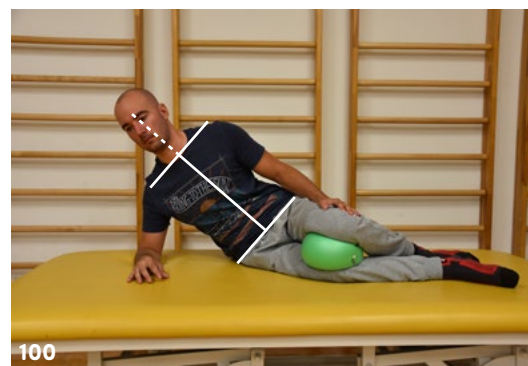
**i** However, this position can pull on the limb too much from the hip or wrench the knee.

- In such case, it is better to support the knee of the rear limb. (99)

- In case the legs are placed on one another, it is possible to place a soft mat between the knees. (100)

**i** The position then however becomes more difficult in terms of stability, the knees may tend to slip over each other.

- Settings of the legs with the one above bent forward is mostly inadequate for maintaining a straight torso, and it again could have an adverse impact on the hips or knee. (101)



## Exercise 37

### Starting position:

Diagonal seating, arm above along the body, extended at the elbow. (102)

### Performing the movement:

Extend the arm above towards the ceiling. (103)

### Notes:

This exercise is difficult in terms of stability. It will be easier for those able to apply multiple torso muscles.

**i** It is important to keep the torso as firm as possible, without rotating to the rear and front.

The arm must remain at the level of the torso, it should be neither in front nor behind the torso.



## Exercise 38

### Starting position:

Diagonal seating, the arm above slightly above the torso. (104)

### Performing the movement:

Extend the arm above until outstretched. (105)

### Notes:

**i** It is important to keep the torso as firm as possible, without movement to the sides or drooping onto the supporting limb.



## Exercise 39

### Starting position:

Diagonal seating, the extended arm above aims for the ceiling. (106)

### Performing the movement:

Extend the arm to the front until outstretched. (107)

### Notes:

The exercise is again difficult for maintaining the torso and it will be easier for those able to apply multiple torso muscles.

**i** It is important to keep the torso as firm as possible, without movement to the sides or drooping onto the supporting limb.

## Exercise 40

### Starting position:

Diagonal seating, the torso is rotated forward, the arm above is also leaning on the mat. (108)

### Performing the movement:

Do a pushup on the limb above (during the pushup the torso rotates through the shoulder of the supporting limb). (109)

### Notes:

The head remains extended with the spine, the chin sticks down towards the neck.

**i** Most important in this exercise is to keep the supporting shoulder below active and not to „hang“ on it.





## Exercise 41

### Starting position:

Diagonal seating, the extended arm above aims for the ceiling. (110)

### Performing the movement:

Extend the arm above to the front, the torso also rotates forward together with it. (111)

### Notes:

The shoulders should remain wide, the thoracic spine straightened, without bending.

**i** Most important in this exercise is to keep the supporting shoulder active and not to „hang“ on it.



## Exercise 42

### Starting position:

Diagonally seating, the torso slightly rotated forward, the arm above is also leaning on the mat. (112)

### Performing the movement:

Lean on the supporting arm below until the elbow is extended, in the course of the movement the torso also raises. (113)

### Notes:

Hold both shoulders away from the ears and spread wide.

**i** Actively press both hands into the mat.  
The torso is straightened.



## Exercise 43

### Starting position:

Diagonal seating, the arm extends out to the side with elbow extended. (114)

### Performing the movement:

Push up the supporting arm below until the elbow is extended, in the course of the movement the torso also raises. (115)

### Notes:

Hold both shoulders away from the ears and spread wide. Actively press the entire area of the supporting hand into the mat, the thumb-side and little finger-side of the palm and all fingers remain fixed to the mat. Torso straightened, maintaining it without leaning forward or backward.



When raising, the torso stretches behind the limb as far as possible.

## Exercise 44

### Starting position:

Diagonal seating, legs and pelvis are on the soft mat. The forearm of the arm below leans evenly into the sliding mat placed on the floor. The elbow is roughly under the level of the shoulder. The arm above is leaning in front of the body on the palm into the sliding mat. (116)

### Performing the movement:

Slide the arms along the sliding mats to the sides, the torso during the movement comes to a level position and moves toward the floor. (117)

### Notes:

It is important throughout the entire movement and mainly during the return movement to keep the spine straight, the head not sticking out and shoulders pulled away from the ears as wide as possible.



## Exercise 45

### Starting position:

Diagonal seating, legs and pelvis are on the soft mat. The forearm of the arm below leans evenly into the sliding mat placed on the floor. The elbow is roughly under the level of the shoulder. The arm leans on the palm extended forward in front of the body. (118)

### Performing the movement:

Slide the supporting arm below with the sliding mat to the side away from the body. (119)

### Variation 1:

Slide the supporting arm below with the sliding mat forward in front of the body. (120)

### Variation 2:

Slide the supporting arm below with the sliding mat so as to make a circle with the forearm. Circles can be performed in both directions. (121)

### Notes:

It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.





## Exercise 46

### Starting position:

Diagonal seating, legs and pelvis are on the soft mat. The forearm of the arm below leans evenly into the sliding mat placed on the floor. The elbow is roughly under the level of the shoulder. The arm above is leaning in front of the body on the palm into the sliding mat. (122)

### Performing the movement:

Slide the arm above with the sliding mat towards the front of the body. (123)

### Variation 1:

You engage other muscle groups by changing the angle in the direction of sliding. (124)

### Variation 2:

Slide the arm above with the sliding mat so as to make a circle. Circles can be performed in both directions. (125)

### Notes:

It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.





# Position in a high kneel

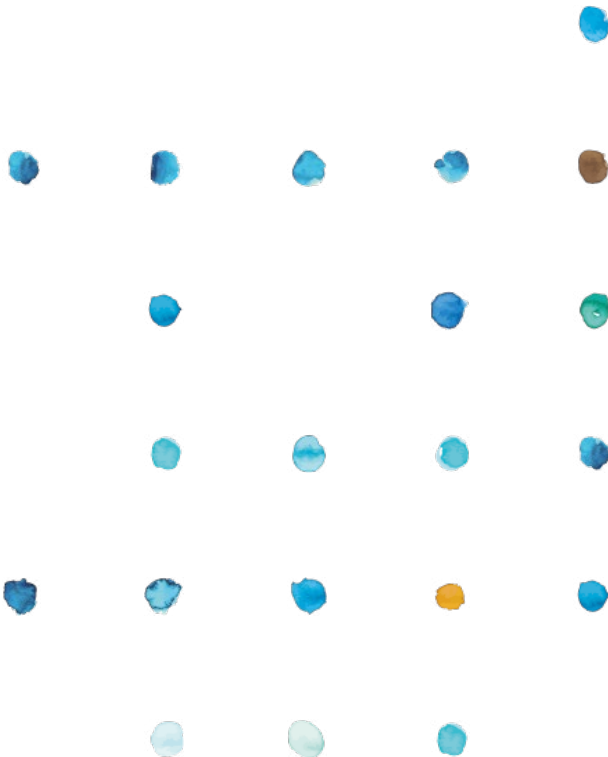
This position is the most difficult of all.  
Holding it depends on the strength of the arms.

## Basic setting in a high kneel:

- The arms are leaning on the bed or e.g. on a chair.
- The head is held straight, again extended with the spine.
- The legs are leaning on knees that are pelvis-width apart, the heels are a bit closer together. The legs should not be crossed. (126)
- Maintaining good positioning of the torso depends also on the possibilities of activating the torso muscles.

If it is not possible to hold the torso without bending the lumbar spine using the stomach muscles, it is better to lean the chest or pelvis to the front on the edge of the bed.

If the lumbar spine is still rather bent, it is appropriate to select support on the forearm, the torso is then better supported. (127)



## Exercise 47

### Starting position:

High kneeling with leaning on the forearms. (128)

### Performing the movement:

With one arm, lean on the palm and gradually extend the elbow – do the same with the other in the same manner. (129a/b) Then gradually move both arms back to the start position. (129c)

### Notes:

The head is extended with the spine, be careful not to stick the chin forward.



128



129a



129 b



129c



## Exercise 48

### Starting position:

High kneel. (130)

### Performing the movement:

Release one arm from resistance and lift until outstretched in front. (131)

### Variation:

This exercise can be performed with an overball. (132, 133)

### Notes:

The forearms lean in their entire length.  
The head is extended with the spine,  
be careful not to stick the chin forward.

**i** The shoulder of the free arm tends to droop along with the torso to the mat.  
Hold both shoulders constantly in one plane, the torso may neither rotate nor tilt.



## Exercise 49

### Starting position:

High kneel. (134)

### Performing the movement:

Release the pelvis and torso until they relax towards the heels, then straighten back up. (135)

### Notes:

The shoulders have a great tendency to pull back towards the ears. Hold your head away from the ears vigorously throughout the exercise. The head is extended with the spine, be careful not to stick the chin forward.

- ! Also keep an eye out for heavy bending in the lumbar spine.

## Exercise 50

### Starting position:

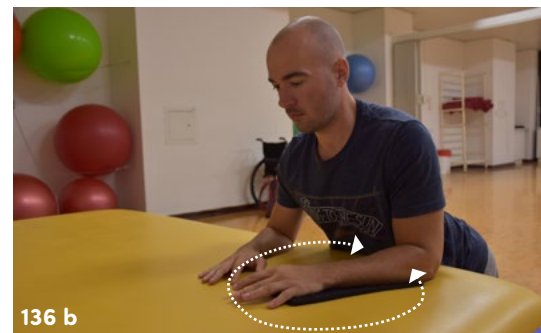
High kneel, one of the forearms is leaning into the sliding mat placed on a treatment table or bed. (136a)

### Performing the movement:

Slide the arm along the sliding mat by a circular movement. Circles can be performed in both directions. (136 b)

### Notes:

It is important throughout the entire movement to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.





## Cvik 51

### Starting position:

High kneel, one of the forearms is leaning into the sliding mat placed on a treatment table or bed. (137)

### Performing the movement:

Slide the sliding mat to the front until the elbow is extended. (138)

### Variation 1:

You can slide the mat in several directions – with extension of the elbow diagonally to the side or through the center of the body. (139a/b)

### Variation 2:

You can slide the mat to the side with bent elbow. (140)

### Notes:

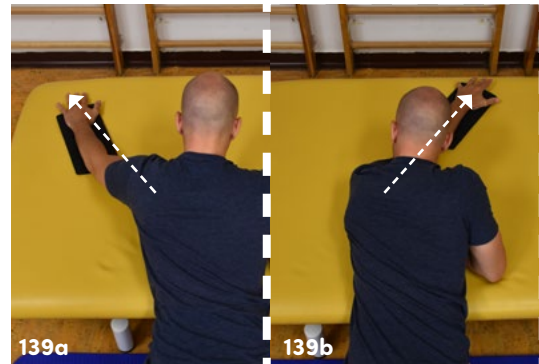
It is important throughout the entire movement and **mainly during the return movement** to keep the spine straight, the head not sticking out and shoulders pulled away from the ears.



137

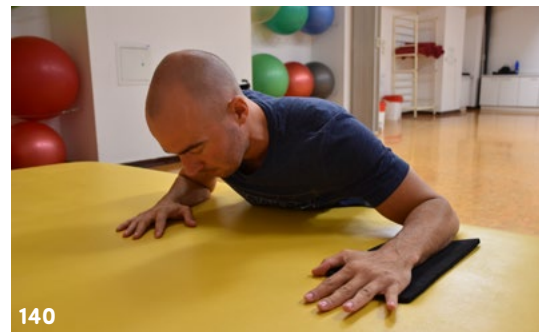


138



139a

139b



140



## Exercise 52

### Starting position:

High kneel leaning on the forearms, palms are leaning on an overball. (141)

### Performing the movement:

Both arms simultaneously straighten at the elbow, into resistance with the palms on the overball. (142)

### Variation:

You can perform the most difficult variant leaning on a large ball. (143, 144)

### Notes:

Shoulders away from the ears!

- ! Keep an eye out for heavy bending in the lumbar spine, to which this exercise may lead



141



142



143



144



This brochure comes to you from the team of physiotherapists at the Spinal Unit of FN Motol. ←



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We thank all our colleagues and it is our wish that this brochure would serve you well. ←

