EXERCISE GUIDE

LSR ✚ | **LIFE SCIENCE ROBOTICS**

GENERAL GUIDELINES

The exercise guide is a guideline about the possible exercises that can be performed with the
medical device ROBERT®. The purpose is to provide exercise examples for the operator, to evaluate the possible options of
the training. It shall be seen as an inspiration and not as a recommendation for physical therapy of any kind.

THE GENERAL GUIDELINES APPLY TO ALL TYPES OF EXERCISES

1. Place ROBERT® so that the base of the arm is approximately in front of the lower leg. This will give you the greates ROM and minimize the necessity to move ROBERT® or the patient.

2. Test the ROM before programming multiple exercises, to avoid the robot arm not being able to reach. Move the patient and ROBERT® accordingly.

3. High variability in exercises, repetitions and resitances enables a treatment with a wide range of different patients.

4. Train the muscles in different positions for an increased effectiveness of the training.

5. ROM - the range of motion dictates the difficulty of the exercise, the longer the ROM the harder the resistance becomes towards the end.

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THE GENERAL GUIDELINES APPLY TO ALL TYPES OF EXERCISES

Guided: Start position

Guided: End position

6. Precision of movement (Guided) - ROBERT® copies all movements precisely, therefore, movements must reflect the desired path of motion.

Active: Start position

Active: End position

7. Precision of movement (Active) - ROBERT® moves in a straight line from start to end position and disregards movements in between.

8. Position of linkage - the angle of the linkage position determines the path of motion and defines how much movement is allowed.

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9. Plan the exercises in order to ensure a smooth transition between them. If the end position of the first exercise is close to the start position of the next exercise, the transition between the exercises is much shorter and hence allows a more agile training.

EXERCISE EXAMPLES

PATIENT SUPINE POSITION - USE FIXTURE NO.1

Plantar/Dorsal

1. Freehand vs pillow - you can plan the plantar/dorsal exercises both freehand or with the support of a pillow; the height depends on the aim of the exercise. Keep the leg high to reduce edema.

2. Change the angles of the exercise to soften up stiff lower legs. Plan multiple exercises with increasing ROM.

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EXERCISE EXAMPLES

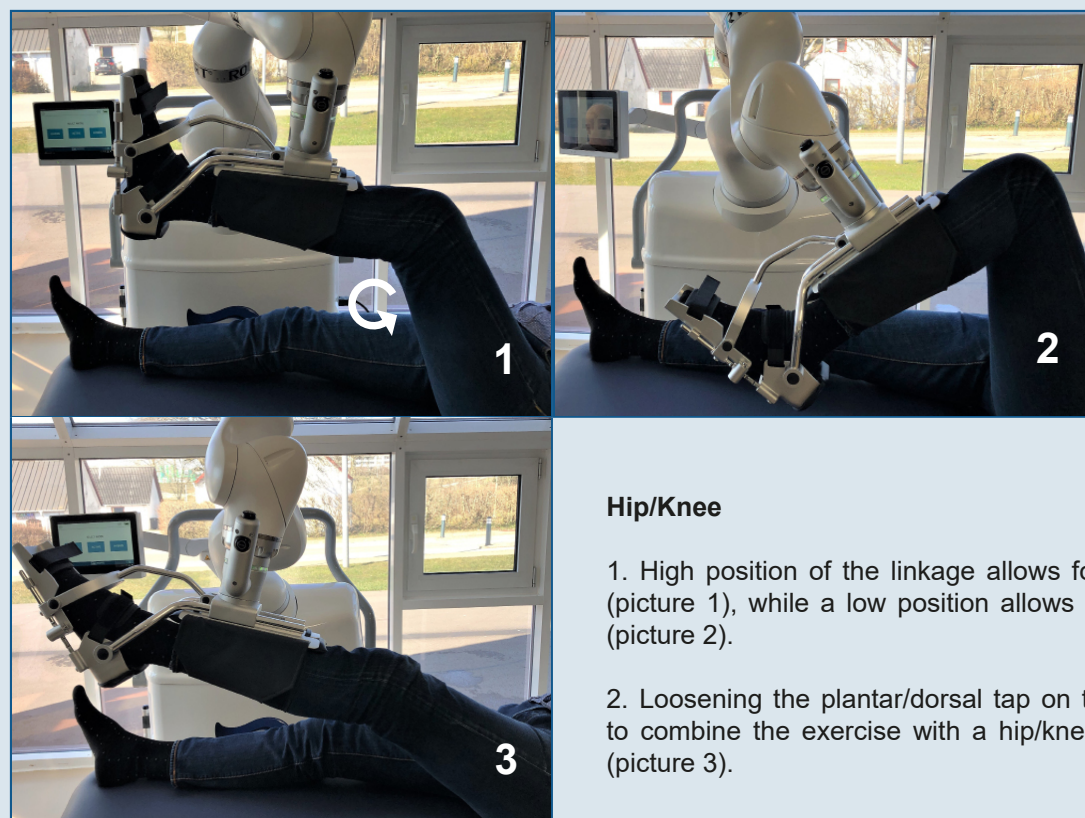### PATIENT SUPINE POSITION - USE FIXTURE NO.1

Isolation of knee flex/extension

Abduction/Adduction

1.   Abduction/Adduction muscles are generally weaker - lower the resistance or limit the ROM in order to reduce the force the patient needs to complete the exercise.

Hip/Knee

1. High position of the linkage allows for cycle like movements (picture 1), while a low position allows a more strict movement (picture 2).

2. Loosening the plantar/dorsal tap on the fixture will allow you to combine the exercise with a hip/knee and plantar extension (picture 3).

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EXERCISE EXAMPLES
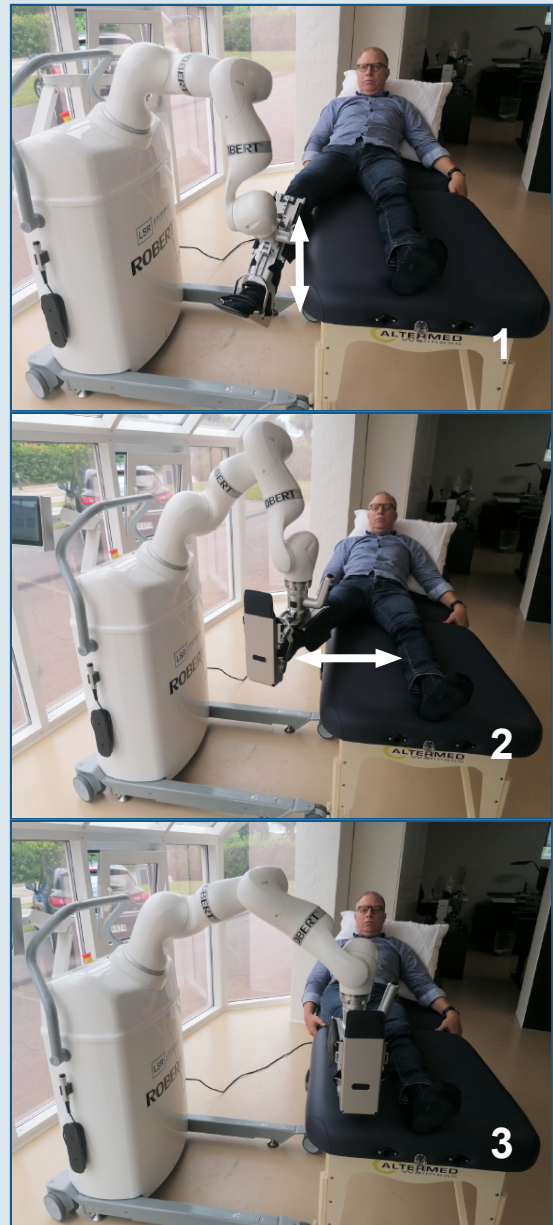
SPECIALIZED EXERCISES - USE FIXTURE NO.1

Proprioceptive neuromuscular facilitation (PNF) stretching

Guided Mode: use the Guided mode to plan the path of this exercise.

"In and out of bed" exercise
The patient in the supine position should be close to the edge of the bed. Knee extensions into hip abduction.

⚠️ **For active mode, split the exercise into two parts.** To avoid collision with the bed during exercise transition, split the exercise into two seperate exercises. Do <u>not</u> use "add motion".

Stretching

Use ROBERT® to help holding the pressure. Move the leg to the desired position and release the "Record" button. Move the leg back to a neural position when the stretching is done.

Guided Rotations

Roating the knee and the hip joints will reduce tonus.

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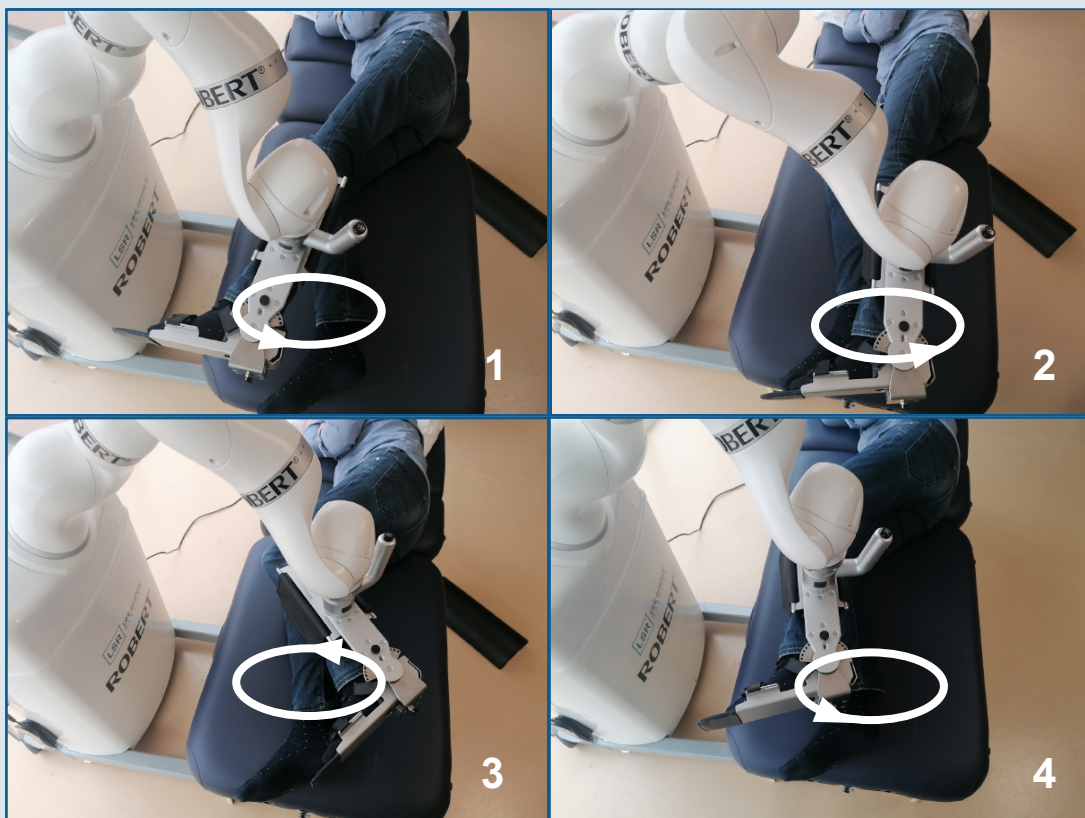
EXERCISE EXAMPLES

PATIENT LATERAL POSITION - USE FIXTURE NO.2

Abduction/Adduction in the lateral position

Hip flex/extension in the lateral position

Facilitated Gait Simulation

Guided mode: Plan a simulated gait movement in lateral position. Utilize maximum ROM and use the Guided mode for this exercise.

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EXERCISE EXAMPLES

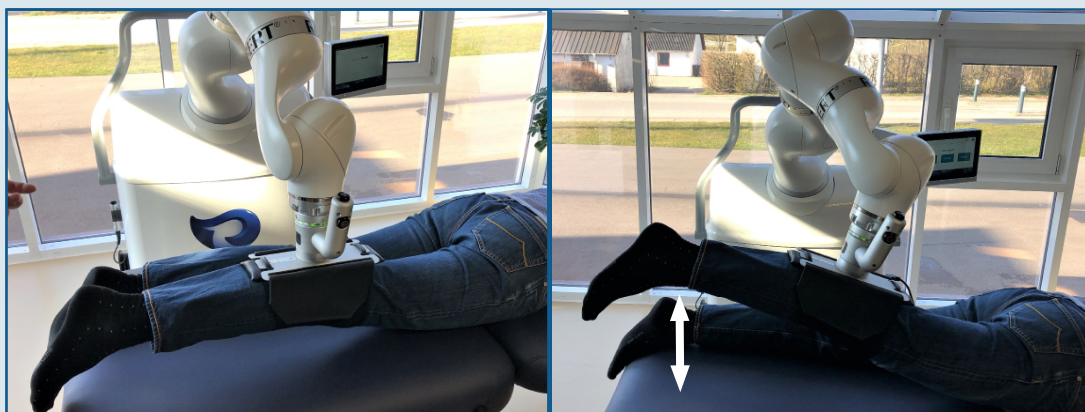### PATIENT PRONE POSITION - USE BRACE

Knee flex/extension

Similar to the supine position, the knee flex/extension can also be performed in the prone position.

Hip Ab-/Adduction

Similar to the supine position, the hip ab/adduction can be performed in the prone position.

The brace can ideally be placed in the knee region, for the best lift capabilities and support for the patient.

Hip extension

Similar to the supine position, the hip extension can be performed in the prone position.

Make sure to place the brace in the good positon.