Standing in a wheelchair – why and how?

In 1975, Swiss company LEVO develops the first stand-up wheelchair in the world

More than 30 years of experience in developing and producing stand-up wheelchairs

Focus on stand-up wheelchairs only

Why stand when one can sit?

1. Medical / therapeutical benefits
2. Functional benefits
3. Psychological benefits
4. Economical benefits

Medical / therapeutical benefits

- Improved circulatory activity
- Deeper respiration
- Pressure relief
- Better digestive passage
- Improved bladder function
- Reduced spasticity
- Reduction of bone mineral loss
- Prevention of contractures

Cardiovascular functions

- Regular position changes keep arteries and veins flexible and increases their blood flow capacity.
- Symptoms such as dizziness, nausea, fatigue and swollen legs can be eliminated.

Functions of the respiratory system

Because the function of the lungs is dependent on force of gravity, lung volume increases by standing. Better ventilation reduces the risk of secondary lung illnesses.

- Vital capacity and tidal volume ↑
- Diffusion O₂ and CO₂ ↑
- Respiratory restriction because of spinal deformation ↓
- Force and mobility of diaphragm ↑

Regula Schuh, end-user: „Since I have been standing regularly, my legs are not swollen and at night I do not have cold feet!“
Functions of the respiratory system

Respiratory restriction:
In sitting, higher intra abdominal pressure results in ribs and the abdominal organs. The diaphragm must work harder in order to make a sufficient inspiration possible.

Skin Protection

Pressure relief
Every year, 17% of persons with SCI in the US are treated as outpatients and 5% as inpatients in hospitals because of pressure ulcers. According to a US study, 38% of those hospitalised with SCI are as a result of pressure ulcers.

Single Case Study
Subject:
• 43 year old Male
• Complete motor and sensory SCI at C5-6 in 1984
• Standard course of post-SCI medical care and rehabilitation
• 3-year history of a non-healing sacral decubitus ulcer

Addition to Previous Treatment
Intervention:
• Standing Wheelchair with electrically-engaged standing feature
• Data logger “LEVO monitor”
• Not more than 20° elevation for at least 30 minutes per day

17 Weeks Later
Results:
• Fully closed pressure sore without other treatment changes
• Skin was pliable and healthy for first time in 3 years
• Less postural pain
• Increased self esteem
• Fewer contractions
• Improvements in cardiac output and blood pressure
**Better digestive process**

Some people with SCI need 1/2-2 hours for their daily bowel motion program. Daily standing exercises can help to shorten the time needed.

- Standing allows for the necessary movement and space for the intestines.

**Improved bladder function**

Every year, 50% of persons with SCI are treated because of bladder infections, 5% are admitted into hospital.

- Optimal position for bladder drainage
- Buckle of urethra (common among men) is stretched
- Increased bladder wall muscle tone
- Reduced bladder spasticity
- Decreased absorption of calcium in blood
- Catheterizing is easier

**Spasticity**

Nancy J. Holland, EdD, vice president Clinical Programs at the National MS Society, USA. If all forms of spasticity are considered, it occurs in an estimated 80% of all persons with MS.

- Daily standing exercises for 30 minutes can reduce spasms by up to 70% in 90% of the spinal cord injured population.
- Medication for spasms can be reduced or totally stopped.

**Bone growth / Reduction of bone mineral loss**

Dr. Shields, University of Iowa, USA. When correctly adjusted the shear forces exerted by the kneepad onto the distal femur (thigh) never exceed 20% of body weight.

- The loss of bone mineral in subjects with SCI is mainly caused by the missing weight bearing of the bones.
- Early mobilization with weight bearing can play an important role in preventing or retarding bone mineral loss after SCI.
- For a healthy bone growth, children should start at an age of 6-14 months with daily standing exercises 2x30 minutes bearing 80% of their body weight.

**Contractures**

Limited range of motion caused by contractures is very common among many wheelchair users! Daily standing exercises can reduce or prevent such contractures. Surgical treatment of contractures is expensive and time-consuming as well as painful for the person concerned!
How to stand

A standing position of 75° to the horizontal transfers 85-90% of the body weight onto the heels.

According to medical evidence, standing seems to be the most effective treatment against contractures.

100% standing is not always indicated for medical benefits. Focus on position change!

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Functional benefits

- Undertaking single and multiple tasks
- Carrying out daily routine
- Communication
- Mobility
- Self Care
- Toileting, washing
- Dressing
- Doing Housework
- Cooking
- General interpersonal interaction

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Back to work access

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Integration through function

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Psychological benefits

- Community life
- Recreation and leisure
- Hobbies
- Socialising
- Human rights

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Economical benefits

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How to get the product right

Proper adjustment

Failures

Failures

Failures

Failure
Failure

Seat cushion is too high/thick:
A high profile seat cushion shall not be brought on the top of the seat support. It must be dropped. In seating position it may work but once you get in a standing it causes hyperlordosis as well as high pressure on the thigh and hyper extended knee joints.

Make the user feel comfortable

Take Home Message

- There is a high evidence for daily standing regarding medical, functional, social and economical benefits.
- LEVO Stand-up wheelchairs give us the possibility, to integrate standing-training into the daily life activities, independently of place and time.
- The LEVO offers different seating and standing variations.

We all can do it – thanks for attending!