EFFECT OF PHYSICAL ACTIVITY

ON HEALTH AND QUALITY OF LIFE:

BENEFITS OF THE MEDICAL DEVICE HUBER

Physical activity is a key factor in maintaining health and normal functioning of physiological systems throughout a person's life. Compared to inactive older people, physically active older people have advantages in terms of physical and cognitive function, mobility, musculoskeletal pain, risk of falls and fractures, depression and quality of life.

Physical inactivity in the elderly is associated with a higher risk of disease: metabolic dysfunction, cardiovascular disease, cancer, sarcopenia (decreased muscle mass and strength). It is also associated with an increased risk of premature mortality from all causes.
Physical activity is now considered to be a real therapy with biological effects on improving patients' health.

MANY CLINICAL EVIDENCE HAS LED THE FRENCH NATIONAL AUTHORITY FOR HEALTH TO INCLUDE PHYSICAL ACTIVITY IN NON-MEDICATED THERAPIES AND TO ENCOURAGE ITS PRESCRIPTION BY PHYSICIANS.

The World Health Organization (WHO) defines quality of life as the way people perceive their position in life, within the context of the culture and the value system in which they live and in relation to their goals, expectations, standards and concerns. It is a broad concept, which intricately incorporates a person's physical health, psychological state, degree of independence, social relationships, personal beliefs and relationship with important elements of the environment. The fields of health and quality of life are complementary and partially overlapping. Quality of life assessment takes into account social, psychological and physical dimensions.

The regular practice of a moderate to high physical activity provides a protective effect against psychological stress, anxiety, depression and thus improve the overall quality of life. Studies showed that **3 hours of physical activity per week**, over periods ranging from a few months to a year, can **improve brain function** as well as cognitive, perceptual and motor skills in the elderly (Bangsbo et al., 2019). Regular physical activity is associated to a reduction in premature mortality (29-41% reduction in all-cause mortality, depending on the study and the type of physical activity). An insufficient level of physical activity (less than one hour per day) increases mortality by up to 33%. A dose effect has been demonstrated: the higher the intensity and duration, the greater the reduction in mortality. Even low-intensity daily physical activity of 15 minutes can reduce the risk of mortality by 14%. Activities that improve cardiorespiratory function can also reduce mortality, and additional effects are shown when combined with muscle strengthening.

Resistance training is a non-pharmacological treatment that can reduce tremors and improve stability and dexterity in seniors. Progressive resistance training (PRT) and a multimodal exercise program are both effective in improving muscle strength and balance. Specifically, PRT appears to be more effective in improving muscle strength and static balance, while multimodal exercises are more effective in improving dynamic balance and gait speed.

In its report, the French National Agency for Medicines and Health Products Safety (ANSM) recommends favoring muscle strengthening in frail elderly people suffering from sarcopenia. Adapted muscle strengthening improves muscle mass and muscular performance. Aerobic exercises improve the oxidative capacity of muscles, which is necessary to maintain intermittent contractions over time (muscular endurance), to increase walking distance and thus reduce dependency.

These different types of exercises can be provided and supervised by rehabilitation professionals, such as physiotherapists. A meta-analysis suggested that the positive effects on balance and muscle strength of supervised training were particularly significant compared to unsupervised training programs. It is therefore recommended to include supervised sessions to get the most out of the benefits of physical activity (Lacroix et al., 2017).

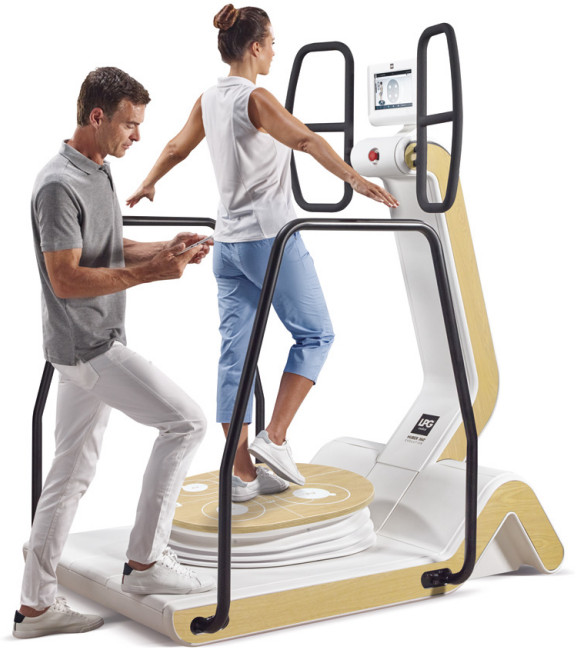
DESCRIPTION OF THE MEDICAL DEVICE HUBER 360® EVOLUTION :

HUBER® is a rehabilitation device consisting of a motorized platform performing rotary oscillatory movements of variable amplitude and speed so as to disturb the subject's balance, who must continually adjust his or her posture by exerting pushing and pulling forces with the arms on a handle system equipped with force sensors (Couillandre et al., 2008). The training exercises consist of adopting specific positions, defined as a combination of different feet and hands positions, and developing low-high levels of strength against the handles. These actions require the synergistic activation of various muscle groups in the lower limbs, trunk and upper limbs.

The handles are equipped with strain gauges, which provide information on the strength applied by the subjects. In addition, an interactive interface, represented as a target, informs the subjects of their ability to maintain the required level of strength. This "gamelike" control panel is intended to stimulate the subject's motivation to practice and adhere to the rehabilitation program.

This medical device has been used in a wide range of patients (age, chronic disease). Information extracted from recent clinical data showed improvement in balance, coordination (gait rehabilitation) and muscle strength (improved hip muscle strength) in patients with deafness (Akınoğlu, B. 2019) or multiple sclerosis (Gherghel C.L. 2019).

CLINICAL BENEFITS OF THE HUBER 360 EVOLUTION DEVICE:



- **Improved flexibility and mobility** through targeted exercises that help patients to rapidly increase their range of motion.
- **Improved posture and balance** with balance games that help patients to regain their balance and become more confident on their feet.
- **Dynamic reinforcement:** on-screen feedback helps patients improve their strength and coordinate their movements in a better way.
- **Improved resistance** with dynamic exercises adapted to the patient's physical condition, to increase endurance.

CLAIMED BENEFITS OF THE HUBER 360 EVOLUTION DEVICE FOR PATIENTS :

- **Improved balance skills** (one or two-task balance ability)
- **Improved muscle strength** (trunk muscle strength, leg power)
- **Improvement in cognitive domains** (language and abstraction, visuospatial/ executive functions and orientation)

Thus physical activity on the HUBER device, supervised by a health professional, is particularly suitable for people who want to stay healthy and improve their quality of life.

FOR FURTHER INFORMATION :

- HUBER device: https://www.lpgmedical.com/en/professional-area/huber/
- HUBER 360® allows the shoulder to be integrated into and through the body in motion: https://www.lpgmedical.com/en/huber-360-allows-the-shoulder-to-be-integrated-into-and-through-the-body-in-motion/
- HUBER 360® and multiple sclerosis: https://www.lpgmedical.com/en/huber-360-and-multiple-sclerosis/
- Deleterious effects of ageing on muscles, fascia and nervous system: https://www.lpgmedical.com/en/deleterious-effects-of-ageing-on-muscles-fascia-and-nervous-system/
- HUBER 360® in chronic low back pain treatment: https://www.lpgmedical.com/en/huber-in-chronic-low-back-pain-treatment/

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3. Bangsbo, J. et al. (2019). Copenhagen Consensus statement 2019: physical activity and ageing. Br J Sports Med 53, 856–858.

4. Lacroix, A. el al. (2017). Effects of Supervised vs. Unsupervised Training Programs on Balance and Muscle Strength in Older Adults: A Systematic Review and Meta-Analysis. Sports Med 47, 2341–2361.

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6. Akınoğlu, B., and Kocahan, T. (2019). Stabilization training versus equilibrium training in karate athletes with deafness. Journal of Exercise Rehabilitation 15, 576.

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