

PRESS RELEASE

Villingen-Schwenningen, 29.06.2020:

Light prevents falls and promotes activity

Study confirms the effectiveness of biodynamic lighting solution

The cortisol level of 20-year-olds; more alert, emotionally more stable and remarkably fewer falls: the care facility pro-persona.care GmbH provides all this for its residents thanks to the use of a biodynamic lighting system by Waldmann. The Institute of Experimental Psychophysiology has confirmed the positive effects on mental and physical health in a field study.

pro-persona.care GmbH operates two therapeutic care centres, one in Altentreptow and one in Neubrandenburg. Both of these facilities include therapeutic day care, preventive care and apartments for independent age-appropriate living. During the core refurbishment, the rooms were organised into various sub-areas and aligned with the maintenance concept of capability enhancement. A lighting concept by Waldmann with biodynamic light, also known as Human Centric Lighting (HCL), is used in almost every area and complemented by a special acoustic ceiling and an individual colour concept. Typical of the Waldmann luminaires are the high content of indirect light, an age-appropriate level of illumination, and glare-free, homogeneous light.

To date there have only been a few scientific studies into the effects of HCL light management systems. So the idea was to analyse the mental and physical effects of biodynamic lighting and compare them with standard room lighting.

In 2019, the Institute of Experimental Psychophysiology carried out the study in collaboration with pro-persona.care GmbH and one other care facility for the elderly. The aim was to investigate scientifically the non-visual effects of light.

Non visual effect of light

Based on the scientific literature concerning the psychophysiological effects of light, it can be assumed that a greater proportion of blue light results in physiological activation in humans.¹ Similarly, initial results indicate that cold light accelerates recovery from stress.² So it follows that targeted use can be made of these non-visual effects of light. The aim of the study was therefore to evaluate the influence of biodynamic lighting with a variable proportion of warm and cold light.

Investigated lighting concepts

The research project considered two different lighting systems in care facilities for the elderly. The pro-persona.care facility in Neubrandenburg uses various suspended and room luminaires by Waldmann with VTL light management. These luminaires are notable for the primarily indirect lighting and automatic time-controlled adjustment of the light colour and level of illumination. The light planning in corridors and day rooms complies with VDI 6008-3 and achieves the highest possible level of illumination to DIN SPEC 67600 on the eye in the activating area.

Conventional lighting consisting of direct radiating light with no biodynamic progression is used in the control facility.

Selection of test subjects and research methodology

One essential prerequisite for a meaningful comparison of the two test groups was the selection of groups of individuals with comparable mental parameters. Consequently, all the participants were of a similar age and there was a balanced gender distribution. They all had a comparable level of certainty or uncertainty when walking or travelling in a wheelchair. Other comparabilities were taken into account in terms of cognitive impairments, general mood, perceived daytime sleepiness, subjective stress experience, and depression screening.

¹ Jung et al. 2010; Leproult, Colecchia, L'Hermite-Balériaux & Van Cauter, 2001

² Minguillon, Lopez-Gardo, Renedo-Criado, Sanchez-Carrion & Pelayo, 2017

It is a known fact that hormones such as cortisol, progesterone, corticosterone, DHEA or cortisone are detectable in the hair, and in particular cortisol, which has a strongly activating effect.³ It is interesting that cortisol release decreases with age. At the end of the study period, hair samples were taken from the test groups and the most recently grown centimetre examined.

Proven positive light effect

The endocrinological analysis yielded significant results. The cortisol level in the test group with VTL lighting was up to three times higher than that of the control group, and comparable with the cortisol level of 17-20 year olds. The resulting effects were substantiated in a questionnaire.

Thus, for instance, there was a significant reduction in daytime sleepiness. The lighting system also had an emotionally stabilising effect. The residents felt far more confident when walking or travelling in a wheelchair, and overall were less afraid of falling. Light perception and intensity were rated much higher. At the same time, the participants experienced a higher degree of alertness and a more comfortable atmosphere.

Positive effects were also evident among the staff. The level of alertness increased, as did those of attention and activity. The biodynamic light also had a stabilising effect on the sleep-wake rhythm. The lighting solution is seen as a basic enhancement of the workplace. The effects correspond to an increase in quality of life and work on an individual level.

Remarkably low fall rate

Gerd Bekel, Managing Director and Head of Scientific Research at pro-persona.care GmbH, initiated the Enriched environment concept during the furnishing of the care facilities in Neubrandenburg and Altentreptow, which also includes the biodynamic lighting by Waldmann. Since it was put into operation, he has been able to look back

³ Kumari, M., Badrick, E., Chandola, T., Adam, E.K., Stafford, M., Kivimaki, M.(2009). Cortisol secretion and fatigue: Associations in a community-based cohort. *Psychoneuroendocrinology*, 34, 1476-1485. doi: 10.1016/j.psyneuen.2009.05.001

on a pleasing development in the fall rate, and sums up his observations: "It is particularly pleasing that we have a very low fall rate among our clients even though around 80% of all clients had an increased risk of falling. In normal households and in care facilities, this rate is more than 50%. This difference is significant, and clearly down to our care concept and to the light management."

Captions

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B1_ A care facility in Neubrandenburg has observed a remarkable decline in the number of falls thanks to biodynamic lighting solutions by Waldmann. A study has confirmed the positive effect the lighting has on the elderly.



B2_ A look at one of the residents' rooms. The luminaires are all characterised by a high proportion of indirect light, an age-appropriate level of illumination for the residents, and glare-free, homogeneous light.

Waldmann – Engineers of Light

Anyone based in the Black Forest must shine very brightly indeed. Today, the fourth generation of the Waldmann family develops lighting solutions that provide people with the optimum support whatever they are doing, whether in the office, on machinery, in industrial workplaces or working in healthcare. The "Engineers of Light" are constantly re-thinking light. For over ten years, Waldmann's biodynamic luminaires (Human Centric Lighting) have been providing people who spend a lot of time working indoors with the positive effects of natural light. With its digital solutions, the lighting experts are able to get the most out of the floor space and the company's staff and increase safety in healthcare. Derungs is a brand name of Waldmann. Derungs Licht AG is based in Gossau, Switzerland, and is the Competence Centre for the sectors Care and Health.

Press Contact:

Annett Schenkenbach, press office Derungs Licht AG,
Hofmattstrasse 12, 9200 Gossau (Switzerland),
Tel.: +41 071 388 11-66, E-mail: annett.schenkenbach@derungslicht.com

Contact information Sales Germany:

Herbert Waldmann GmbH & Co. KG
Peter-Henlein-Strasse 5
78056 Villingen-Schwenningen
Germany
Tel.: +49 7720 601 100
Fax: +49 7720 601 290
Email: sales.germany@waldmann.com