

medical

fitness and healthcare

Severe disease courses and
overweight

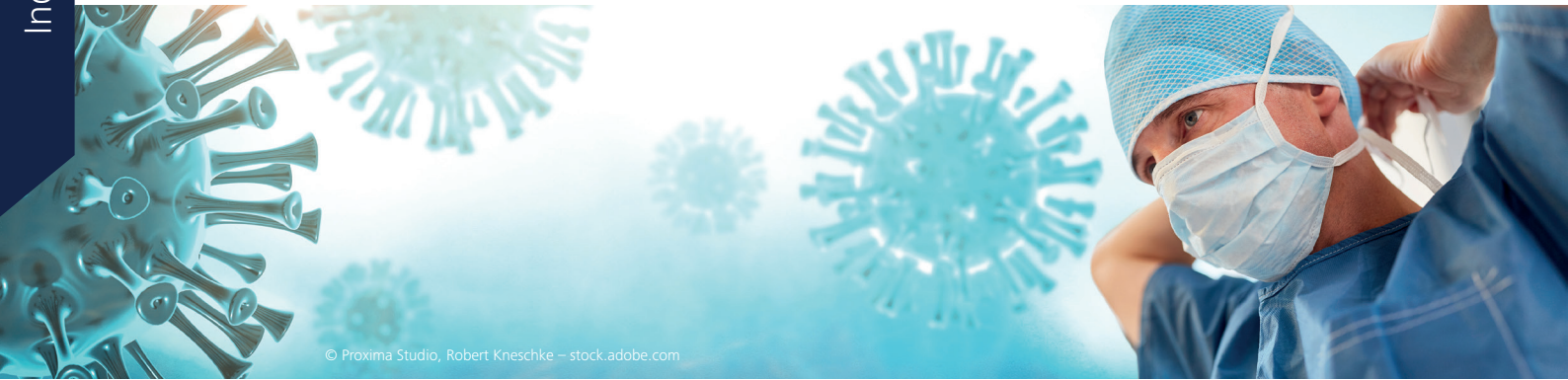
Nutrition and physical activity
are important

Gyms can have
a sigh of relief



Overweight:

Risk factor for severe
Covid-19 progression



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Overweight:

Risk factor for severe Covid-19 progression

High body weight is one of the risk factors, that can have a significant impact on the course of a coronavirus infection. Several recent studies show increased risks for hospital stays, invasive mechanical ventilation, as well as a higher mortality risk. Weight loss induced by lifestyle changes and increased physical activity can help lower the risk of a severe course of the disease.

Since the beginning of 2020, the new coronavirus named SARS-CoV-2 (Severe Acute Respiratory Syndrome) has been determining the everyday life of people all over the world. The virus is transmitted by droplet infection and initiates a disease called Covid-19, which can progress to severe illness with respiratory problems and pneumonia. There are large differences in the course of the disease between young and old, which are clearly reflected in the death rate. According to the Robert Koch Institute (RKI), 90 % of the deceased in Germany were older than 70 years. High risk patients are elderly people and those with different pre-existing conditions, like cardiovascular disease, diabetes, and chronic diseases of the respiratory system, the liver, or the kidneys, as well as cancer, and obesity. Obesity is described as severe overweight, that goes significantly beyond what is considered a healthy weight for a given height. The body mass index (BMI) is a measure of body fat based on height and weight. A person with a BMI between 25 and 29.9 kg/m² is classified as overweight and anyone with a BMI over 30 kg/m² is classified as obese. Obesity itself can be classified into 3 grades. A BMI between 30 and 34.9 kg/m² is classified as grade 1 obesity, a BMI between 35 and 39.9 kg/m² as grade 2 obesity and a BMI greater than 40 kg/m² as grade 3 obesity. Overweight often entails a series of comorbidities. It is therefore not surprising that more and more studies show a correlation between high body weight and a critical course of Covid-19 disease.

Severe disease courses and overweight

In 2018 American researchers at the University of Michigan

were able to find a correlation between the duration of influenza A virus shedding and high bodyweight. Obese participants of the study shed the virus 42 times longer than non-obese, even with asymptomatic or mild courses of disease, and were therefore infectious for a longer period. Additionally, they observed that the course of disease during a viral infection was more severe in overweight people compared to people of normal weight. The study also shows that overweight patients with an influenza infection have a significant higher risk of being hospitalized.^[1] These findings could also be confirmed in recent coronavirus studies. A current study with 3,615 test subjects from New York that tested positive for Covid-19 shows that patients younger than 60 years of age and with obesity grade 1 are twice as likely to receive treatment in the intensive care unit compared to those of normal weight. Patients with grade 2 obesity under the age of 60 even have a 3.6 times higher risk.^[2] These studies show, that regardless of age, obesity has a significant impact on the disease course, which means, that younger people can also belong to the risk group. A French research group also showed that the frequency of invasive mechanical ventilation (IMV) increases with increasing BMI. Up to 85 % of all patients with a BMI greater than 35 kg/m² need an IMV.^[3] There are different possible reasons for the association of high BMI and severe course of disease.

Fat cells can produce messenger substances, that have inflammatory effects. Especially the visceral adipose tissue, which accumulates around the organs in the abdominal

area, plays an important role because of its metabolic activity.^[4] The resulting inflammation occupies the immune system and less free capacities remain to fight the virus. These inflammatory processes inside the body increase the mortality risk and the risk of hospitalization while having a virus infection. Additionally, obesity promotes the formation of reactive oxygen species, which lead to changes in the body, that are similar to the natural ageing process. As a consequence, thereof the mitochondria decrease in size and function, and the ageing of the thymus is accelerated. This results in an affected maturation of the T-lymphocytes and a shortage of naïve T-cells circulating in the blood. Thus, the fight against invading pathogens is impaired.^[5]

Especially in the case of SARS-CoV-2, which can cause a lung disease, the (pre-) burden on the respiratory system plays a major role. Poor ventilation, as well as fat deposits in the lungs often result in severe progressions of respiratory diseases. The use of mechanical ventilators in intensive care units is therefore not uncommon in such cases.^[6]

Nutrition and physical activity are important

Because of the large number of comorbidities, obesity is clearly a burden on the human body, which consequently also affects the patient's recovery in the event of a corona infection. Therefore, for obese patients a weight reduction is an important step to relieve and support their own immune system. Weight loss can be achieved with a healthy, individualized diet change and increased physical activity. Gyms and different sports courses can help realizing these goals. Losing weight is not just a way to improve comorbidities and the overall well-being, it is also specifically important when it comes to a coronavirus infection. In the event of an infection, body weight can influence whether there will be serious complications or only a mild course. The gen diet MetaCheck®, which is offered by a great number of gyms, uses a genetic analysis to determine the optimal, individual macronutrient distribution and the most effective sports type for burning fat. In this way, a personalized approach with the aim of weight loss can be developed for each client and the immune system can be gradually relieved and supported.

Gyms can have a sigh of relief

The reduction of excess body fat and the increase in physical fitness have several positive effects on the human body. The production of inflammatory messenger substances decreases, and the cells of the immune system are no longer overstrained, which enables them to fight the virus. Regular exercise also prevents premature aging and cell death and reduces the burden on the respiratory tract.

According to a Norwegian team of scientists including Lise M. Helsingen, it is safe for gyms to open during the corona pandemic.^[7] The study included 3,764 participants, which were divided in two groups. One group was allowed to exercise in gyms in compliance with the rules of distance and hygiene, while the control group was not allowed to train in gyms. After two weeks, the only positive Covid-19 test out of 3,106 was from a participant that belonged to the first group but did not pursue the offer to go to the gym. The study and the significance of its results are currently being evaluated and must be placed in the overall context

of the global pandemic. Nevertheless, the Norwegian scientists are already concluding that there is no increased risk of infection in gyms as long as the predominant hygiene and distance rules are being followed. ■



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Kristina Seltenreich successfully completed her bachelor's degree in nutrition management and dietetics at the University of Hohenheim. Since 2019 she works as a nutritionist at CoGAP GmbH and is among other things responsible for recipe development and nutritional counselling.

Foto: Kristina Seltenreich



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Sources

- ^[1] Maier, Hannah E., Lopez, Roger, Sanchez, Nery, Ng, Sophia, Gresh, Lionel, Ojeda, Sergio, Burger-Calderon, Raquel, Kuan, Guillermina, Harris, Eva, Balmaseda, Angel & Gordon, Aubree (2018). Obesity increases the duration of influenza A virus shedding in adults. *The Journal of Infectious Diseases*, 218(9), 1378-1382. doi: 10.1093/infdis/jiy370
- ^[2] Lighter, Jennifer, Phillips, Michael, Hochman, Sarah, Sterling, Stephanie, Johnson, Diane, Francois, Fritz & Stachel, Anna (2020). Obesity in patients younger than 60 years is a risk factor for COVID-19 hospital admission. *Clinical Infectious Diseases*, 71(15), 896-897. doi: 10.1093/cid/ciaa415
- ^[3] Simonnet, Arthur, Chetboun, Mikael, Poissy, Julien, Raverdy, Violeta, Noulette, Jerome, Duhamel, Alain, Labreuche, Julien, Mathieu, Daniel, Pattou, Francois & Jourdain, Merce (2020). High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) requiring invasive mechanical ventilation. *Obesity*, 28(7), 1195-1199. doi: 10.1002/oby.22831
- ^[4] Fontana, Luigi, Eagon, J. Christopher, Trujillo, Maria E., Scherer, Philipp E. & Klein, Samuel (2007). Visceral fat adipokine secretion is associated with systemic inflammation in obese humans. *Diabetes*, 56(4), 1010-1013. doi: 10.2337/db06-1656
- ^[5] Tam, Bjorn T., Morais, Jose A. & Santosa, Sylvia (2020). Obesity and ageing: Two sides of the same coin. *Obesity Reviews*, 21(4). doi: 10.1111/obr.12991
- ^[6] Kalligeros, Markos, Shehadeh, Fadi, Mylona, Evangelia K., Benitez, Gregorio, Beckwith, Curt G., Chan, Philip A. & Mylonakis, Eleftherios (2020). Association of obesity with disease severity among patients with coronavirus disease 2019. *Obesity*, 28(7), 1200-1204. doi: 10.1002/oby.22859
- ^[7] Helsingen, Lise M., Løberg, Magnus, Refsum, Erle, Gjostein, Dagrun Kyte, Wieszczy, Paulina, Olsvik, Ørjan, Juul, Frederik E., Barua, Ishita, Jodal, Henriette C., Herfindal, Magngild, Mori, Yuichi, Jore, Solveig, Lund-Johansen, Fridtjof, Frøtheim, Atle, Bretthauer, Michael & Kalager, Mette (2020). Randomized re-opening of training facilities during the Covid-19 pandemic. TRAI study group. doi: 10.1101/2020.06.24.20138768