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**Title:** Decrease of physical activity in patients with COPD in the course of the disease

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**Body:** Background: COPD is a progressive lung disease that affects physical activity of patients. Little is known about the changes of physical activity in the course of the disease. Methods: We measured total daily energy expenditure, the physical activity level (total daily energy expenditure divided by resting metabolic rate), and steps per day by a multisensory armband over a period of 5 to 6 consecutive days in 26 patients with chronic bronchitis and 137 COPD patients (GOLD stage I - IV) at baseline and at follow-up. Results: During a median follow-up of 2.8 years (range, 1.8 - 3.5) total daily energy expenditure decreased from 2708 kcal (SD 590) to 2518 kcal (SD 536) resulting in an annual rate of decline of 68 kcal (P <0.001). Physical activity level decreased from 1.57 (SD 0.28) to 1.48 (SD 0.25) resulting in an annual rate of decline of 0.03 (P <0.001). Steps per day decreased from 6822 (SD 3786) to 5685 (SD 3546) resulting in an annual rate of decline of 418 steps (P <0.001). The absolute decline of total daily energy expenditure, physical activity level, and steps per day was independent of baseline disease severity. The relative changes of all physical activity parameters were higher in patients with severe and very severe COPD. Conclusion: Physical activity decreases across all severity stages of COPD in the course of the disease with relative changes being most prominent in severe stages.