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1: [Clin Endocrinol \(Oxf\)](#). 2001 Jun;54(6):709-17.

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## Body composition and quality of life in adults with growth hormone deficiency; effects of low-dose growth hormone replacement.

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**OBJECTIVE:** Adult growth hormone deficiency (AGHD) is characterized by abnormalities in body composition and a poor perceived quality of life (QoL). Weight-based high-dose growth hormone replacement (GHR) results in improvements in body composition and QoL in AGHD. However, a high patient percentage reported side-effects on high-dose GHR resulting in a high rate of patient withdrawal from growth hormone (GH) treatment. High-dose GH therapy also leads to supraphysiological serum insulin-like growth factor-I (IGF-I) concentrations that have been associated with breast and prostate cancer, raising major concerns over the use of such high-dose GH regimen in AGHD. The aim of this study was to assess the effects of low-dose growth hormone replacement (GHR) on body composition and QoL as early as 1 and 3 months. **STUDY DESIGN:** A prospective, open treatment design study to determine the early effects of low-dose GH administration on body composition and QoL. GH was initiated at a daily dose of 0.4-0.5 IU, and titrated up to achieve and maintain IGF-I standard deviation score (IGF-I SDS) between the median and upper end of the age-related reference range. **PATIENTS:** Forty-six, post-pituitary surgery, severe AGHD patients (22 women), defined as peak GH response < 9 mU/l to provocative testing. The mean age was 50.4 years (range 26-72). Forty-three patients required additional pituitary replacement hormones following pituitary surgery and were on optimal doses at recruitment. **MEASUREMENTS:** Body composition and QoL were assessed prior to GHR and subsequently at 1 and 3 months after initiating GHR. Body mass index (BMI) and waist hip ratio (WHR) were calculated from measurements of height, weight, and waist and hip circumference, respectively. Bioelectrical impedance analysis (BIA) was used to determine body fat and lean body mass. QoL was assessed using the disease-specific 'QoL-assessment of growth hormone deficiency in adults (QoL-AGHDA)' questionnaire. Serum IGF-I was measured at each visit to assess the adequacy of GHR. **RESULTS:** IGF-I and IGF-I SDS increased significantly at 1 and 3 months ( $P < 0.001$ ) after commencing GHR. The increase in IGF-I ( $P < 0.05$ ) and IGF-I SDS ( $P < 0.01$ ) was significant between 1 and 3 months in the absence of any significant increase in GH dose ( $P = ns$ ) during this period. Eighty-five per cent of patients achieved IGF-I SDS levels between median and upper end of the age-related reference range after 3 months of GHR, and no side-effects were reported during this period. There was a significant reduction in body fat percentage (BFP) from 36.1 +/- 9.1% at baseline to 34.9 +/- 9.3% ( $P < 0.01$ ) at 1 month and 34.1 +/- 9.2% ( $P < 0.001$ ) at 3

months. Body fat mass (BFM) reduced from 32.8 +/- 13.6 kg at baseline to 31.9 +/- 13.9 kg at 1 month (P < 0.05) and 31.1 +/- 13.6 kg at 3 months (P < 0.001). These changes in BFP and BFM occurred in the absence of any significant change in BMI and WHR (P = ns). Lean body mass (LBM) was 55.9 +/- 11.1 kg at baseline and increased to 57.1 +/- 11.3 kg after 1 month (P < 0.01) and to 57.6 +/- 11.5 kg (P < 0.001) after 3 months of GHR. Significant improvement was observed in the perceived QoL with the AGHD assessment scores reducing from 13.3 +/- 6.4 to 11.5 +/- 6.6 within 1 month (P < 0.01) and 10.0 +/- 6.6 at 3 months (P < 0.001). There was no significant correlation between improvement in QoL and changes in body fat percentage (r = 0.01 at 1 month and r = 0.12 at 3 months, P = ns) or IGF-I levels (r = 0.04 and r = 0.003, P = ns at 1 and 3 months, respectively). The improvement in body composition and QoL was significant between 1 and 3 months. **CONCLUSIONS:** Low-dose GHR improves body composition and QoL as early as 1 month after commencement and the beneficial effects continue at 3 months. Most importantly, these changes occur in the absence of side-effects. We therefore suggest the use of low-dose GH therapy, maintaining IGF-I between the median and upper end of the age-related reference range, for the treatment of AGHD.

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