**Introduction**

Growth hormone (GH) increases lean body mass and reduces fat mass. However, the long-term changes in weight status during growth hormone treatment, according to age and weight status at the onset of therapy, have not previously been reported in large data sets.

**Aim**

To identify the growth response (change in HTSDS and BMI SDS) to GH therapy in underweight versus normal weight short children.

**Materials**

Retrospective study. Growth data of 78 short, pre-pubertal children (HTSDS < -2 SDS below the mean for age and sex) with normal GH secretion were reviewed.

Children divided according to BMI into 2 groups:

- Group 1: underweight (BMI SDS < -2) N= 19.

For 2 years, all children received a daily SC dose of GH (0.03 – 0.05 mg/kg/day) to keep their IGF1 level between 0 and 2SD.

**Results**

Before GH treatment, the underweight children (group 1) had a significantly lower IGF1 level versus the normal-weight children (group2). Age and HTSDS did not differ among the two groups. Treatment with GH for two years was associated with a significant increase in the BMI SDS in the underweight group. As their (BMI-SDS increased by 0.45 SD) but not in the normal-weight group.

The HTSDS increased significantly in both groups after GH therapy, but the increase was more significant in children with normal weight than underweight.

<table>
<thead>
<tr>
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<th>Low BMI</th>
<th>NL BMI</th>
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<tbody>
<tr>
<td><strong>HTSDS1</strong></td>
<td>-2.345</td>
<td>-2.203</td>
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<tr>
<td><strong>HTSDS2</strong></td>
<td>-2</td>
<td>-1.83</td>
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<td><strong>P</strong></td>
<td>0.32</td>
<td>0.001</td>
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**Conclusion**

Two years of GH therapy significantly increased the IGF1 level and improved BMI, BMI SDS, and HTSDS in underweight children with ISS. However, the increase in the HTSDS of underweight children was significantly lower than ISS children with normal weight. Underweight children who had GH therapy increased their BMISDS significantly.