

Validation of prediction models for near adult height in children with idiopathic growth hormone deficiency treated with growth hormone - a Belgian Registry study



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1. Background / Aim

To validate the KIGS prediction models¹ for near final adult height (nFAH) after 1 year of growth hormone treatment in children with idiopathic growth hormone deficiency

1. Ranke MB, Lindberg A, Mullis PE, Geffner ME, Tanaka T, Cutfield WS, Tauber M, Dunger D: Towards optimal treatment with growth hormone in short children and adolescents: Evidence and theses. *Horm Res Paediatr* 2013;79:51-67.

2. Subjects and methods

Height data of 127 (82 male) idiopathic growth hormone (GH) deficient children, treated with GH until nFAH, were retrieved from the BESPEED database. nFAH was predicted after first-year GH treatment applying the prediction models by Ranke et al. Bland Altman plots and Clarke error grid analyses were performed to assess clinical significance of the differences between observed and predicted nFAH.

3. Results

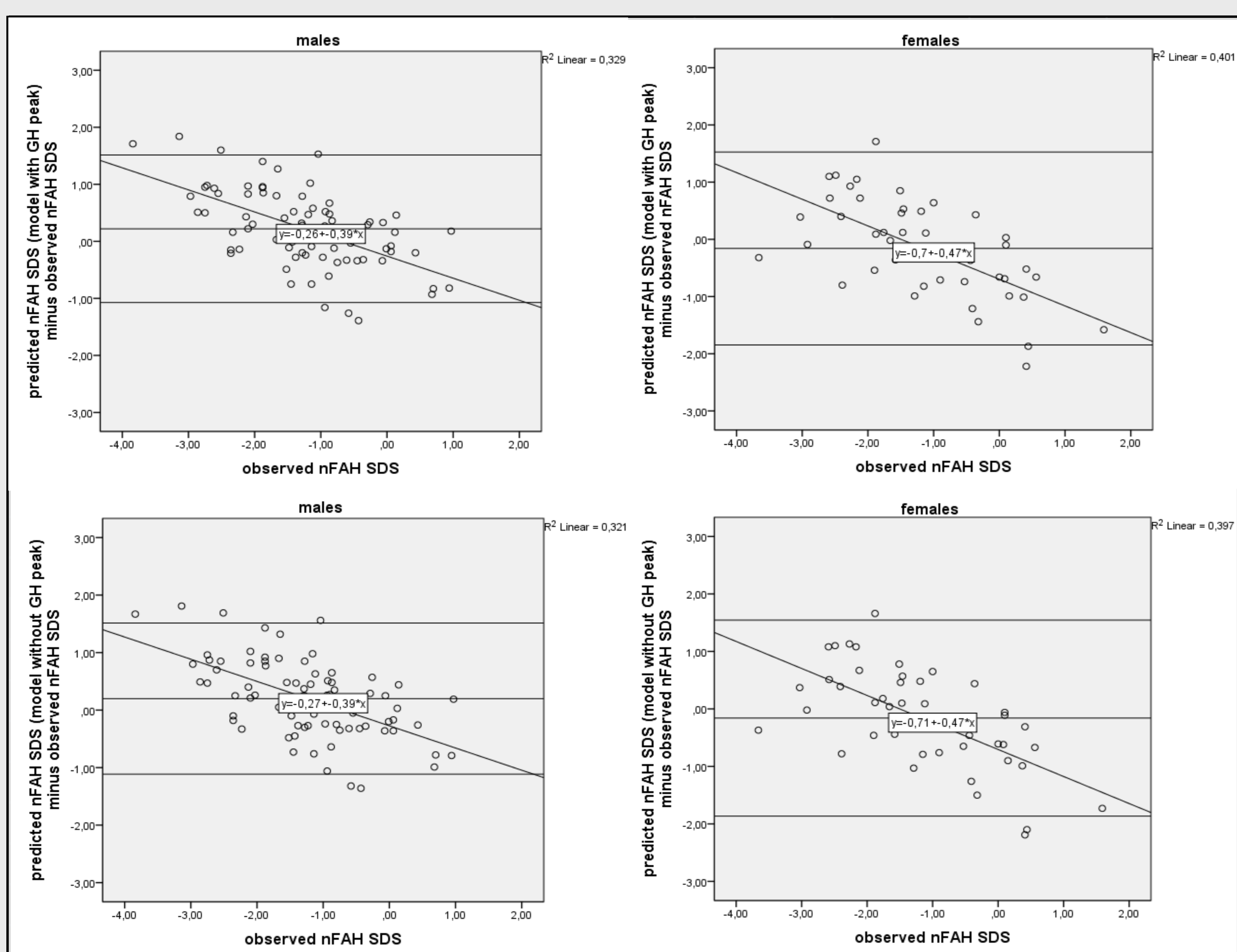
In males, predicted nFAH was higher than observed nFAH (difference: 0.2 SD \pm 0.7; $p < 0.01$). In females, there was no significant difference between predicted and observed nFAH.

Bland Altman plots:

The means of the differences between observed and predicted nFAH were close, but not equal to zero with overprediction for smaller heights and underprediction for taller heights.

Clarke error grid analyses:

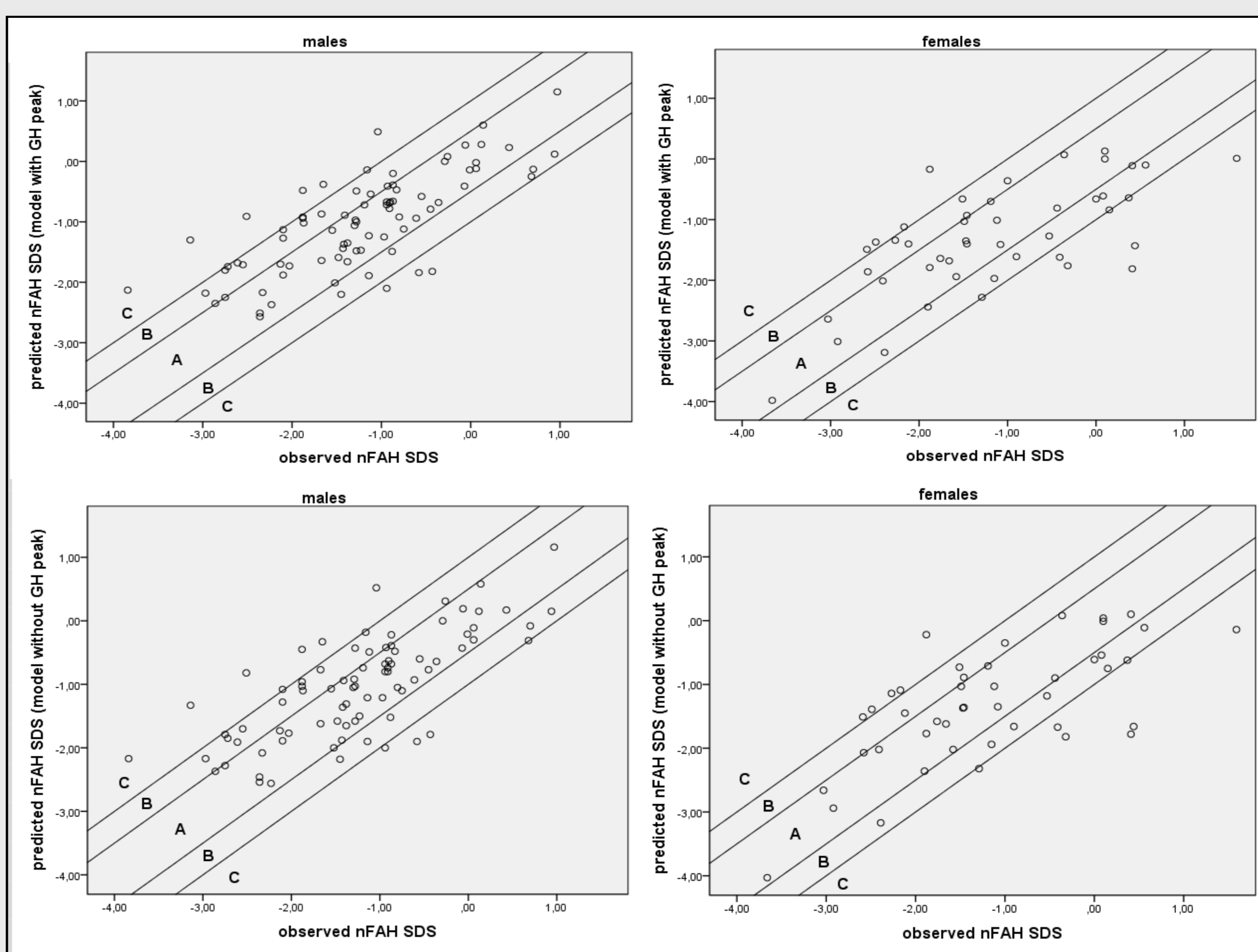
Males: 59-61% of predicted nFAH were within 0.5 SDS (3,5 cm) and 88% within 1.0 SDS (6,9 cm) from observed nFAH. Females: 40-44% of predicted nFAH were within 0.5 SDS (3 cm) and 76-78% within 1.0 SDS (5,9 cm) from observed nFAH.



middle line = mean of the difference; lower and upper line = lower and upper limit of the 95% confidence interval of the mean of the difference

nFAH= near final adult height; references by Prader et al. were used for the SDS calculations

Upper panel: prediction models including the growth hormone (GH) peak
Lower panel: prediction models not including the GH peak



zone A: difference between observed and predicted nFAH < 0,5 SDS

zone B: difference between observed and predicted nFAH 0,5 - 1 SDS

zone C: difference between observed and predicted nFAH > 1 SDS

nFAH= near final adult height; references by Prader et al. were used for the SDS calculations

Upper panel: prediction models including the growth hormone (GH) peak

Lower panel: prediction models not including the GH peak

4. Conclusion

Ranke's models accurately predicted nFAH in females and overpredicted nFAH in males by about 1.5 cm. In most individuals, predicted nFAH was within 1 SDS of observed nFAH. These models can be of help in giving realistic expectations of the effect of GH treatment on adult height.

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