

Which factors influence peak GH response during insulin and clonidine stimulation tests?

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INTRODUCTION

Several factors (bone age, body mass index (BMI), target height, age) have been previously demonstrated to impact on GH response during stimulation tests, none of them proving to be of crucial importance (1).

OBJECTIVE AND HYPOTHESIS

The aim of this study was to analyze the influence of several anthropometric and laboratory parameters on peak GH response during insulin and clonidine stimulation tests.

METHODS

Retrospective review of 265 patients who underwent GH stimulation tests with clonidine and/or insulin in two endocrinology centers (Bucharest and Tirgu-Mures) from Romania between 2009-2015. Variables: age, sex, height SD score, BMI SD score, and IGF 1 SD score, Maximum GH value during clonidine and/or insulin stimulation tests. For height and BMI the Prader standards were used. Statistical analysis used M.O. Excel for data collection and SPSS v. 17.0 with a level of significance $\alpha=0.05$.

RESULTS

Mean age was 9.4 ± 4.0 years with a sex repartition favoring boys (M: F=1.8:1). 165 subjects were GHD deficient according to the peak GH response (<10 ng/ml). In univariate analysis, BMI SDS was negatively correlated with peak GH during clonidine ($r= (-0.20)$, $p=0.0023$) (Fig.1), but not insulin ($r= (-0.13)$, $p=0.1776$). IGF 1 SDS correlates positively with both clonidine and insulin GH peak response ($r= 0.37$ (fig. 2) and 0.30 (Fig.3), $p<0.0001$ and 0.0014 respectively). Age, sex and prepubertal status had no significant influence on the peak GH response. In multivariate regression analysis, BMI SDS and IGF 1 SDS significantly influenced the peak GH response during clonidine, the whole model explaining 11.3% of the response (Table 1). For insulin, the model explained 31.5% of the GH variance with age and IGF 1 SDS being the significant factors (Table 2).

DISCUSSIONS

BMI has been previously proven to influence GH response to different provocative agents (2), fact also demonstrated by our study. Other factors such as young age, spontaneously GH peak proved to influence the GH response, but there isn't a model so far which might predict GH response to provocative agents (3).

Limitations of the study – small sample, advanced age at the time of diagnosis, pubertal status not analyzed.

CONCLUSIONS

BMI SDS negatively correlates with GH response during clonidine, but not insulin GH stimulation test. IGF 1 SDS is the only factor positively correlated with GH response in both provocative tests analyzed.

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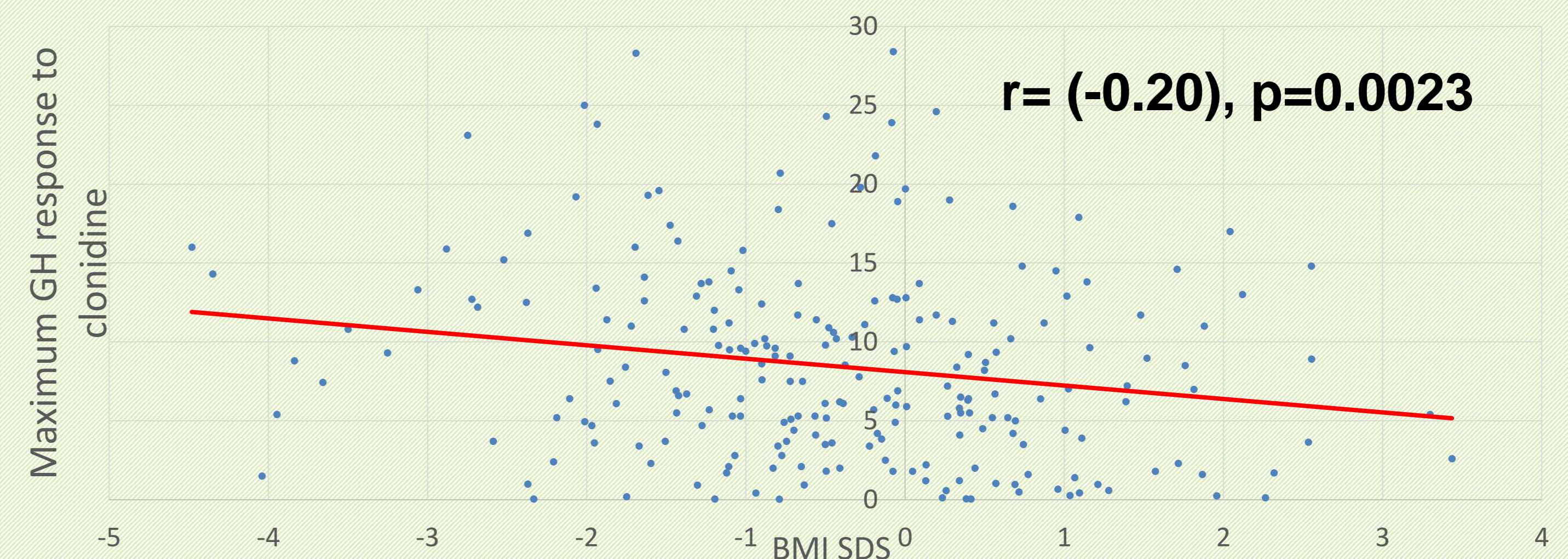


Fig. 1 - Correlation BMI SDS with peak GH response to clonidine

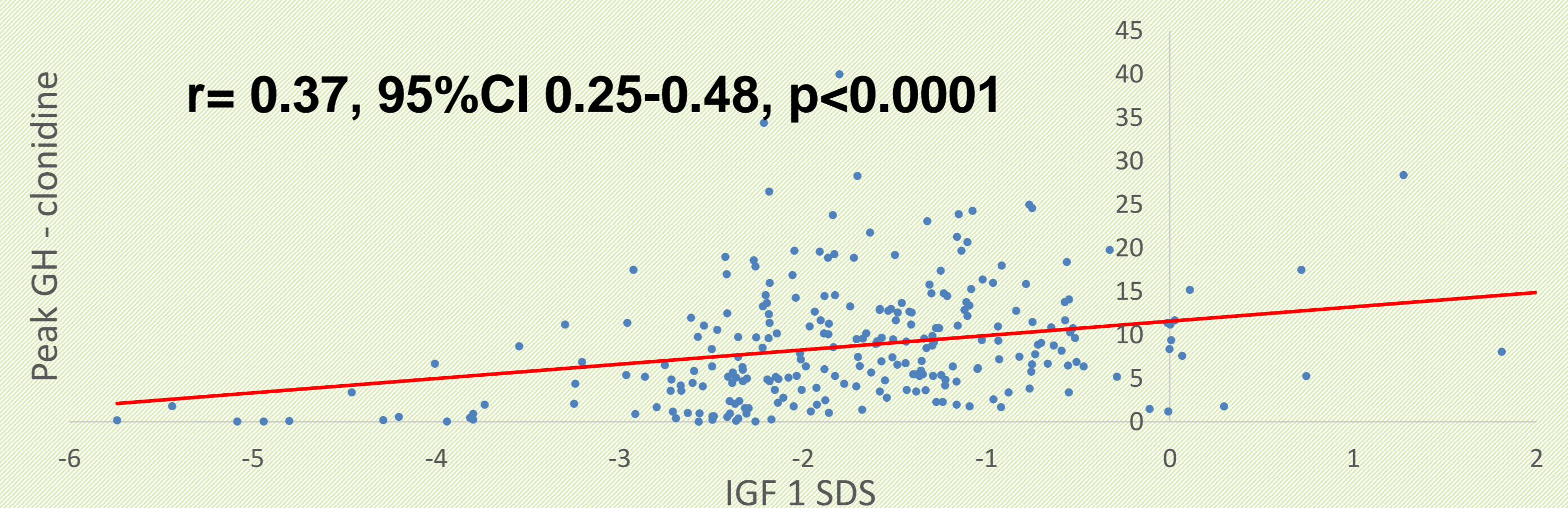


Fig. 2 - Correlation IGF1 SDS - peak GH response to clonidine

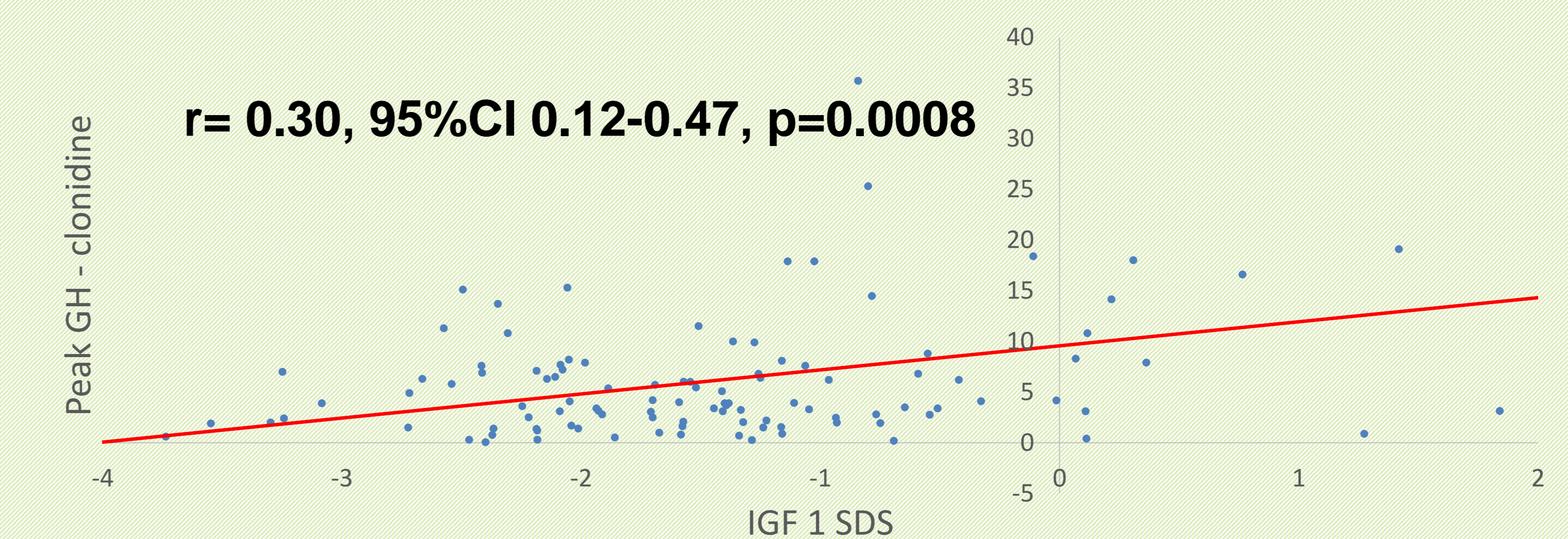


Fig. 3 - Correlation IGF1 SDS - peak GH response to clonidine

Table 1 – Multivariate regression analysis for peak GH response to clonidine (adjusted r square 11.3%)

Parameter	B	95%CI for B	Significance
Age	-.078	-.463 – 0.307	.691
Age <10years	.264	-2.740 – 3.269	.862
Sex	.109	-1.479 – 1.697	.892
Height SDS	.369	-.275 – 1.014	.260
BMI SDS	-.851	-1.398 – (-.305)	.002
IGF 1SDS	1.296	.665 – 1.927	.000

Table 2 – Multivariate regression analysis for peak GH response to insulin (adjusted r square 31.5%)

Parameter	B	95%CI for B	Significance
Age	.952	.435 – 1.468	.000
Age <10years	3.225	-.999 – 7.449	.133
Sex	.535	-1.829 – 2.900	.654
Height SDS	-.777	-1.814 - .260	.141
BMI SDS	-.526	-1.400 – 0.348	.236
IGF 1SDS	1.827	.948 – 2.706	.000