

SHORT REPORT

A common metric for the Griffiths Scales

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The GQ and individual scales from the Griffiths Mental Development Scales (2–8 years) have differing means and standard deviations. They differ from the common standard among developmental tests. Direct comparisons between Griffiths subscale scores and between the Griffiths and other test scores are therefore prone to misinterpretation. A corrective formula for Griffiths scores is supplied with tables for popularly used ranges.

The Griffiths Mental Development Scales have a long and developing history in clinical practice and research. The scales show continuing validity over time and across cultures.¹ The scales have been used, alongside other measures, in many studies reported by this journal. A feature of the scales' original development was the use of standard deviations for each scale based on a simple ratio transformation of the raw data²: the mental age divided by the chronological age. As table 1 shows, this yielded similar, but slightly different means and standard deviations for each scale, including the aggregate general quotient (GQ).

Comparing scale scores with each other is therefore prone to potential error, if they were considered equivalent. In many cases, especially where the scores are close to the mean, this error is minimal. However, the error is exaggerated as scores move away from the mean. This may lead to errors in

interpreting Griffiths quotients, particularly where numerical cut offs for popular developmental and ability ranges are applied to unadjusted scores.

Two solutions are suggested to ensure an informed comparison of scores between individual Griffiths scales and scores from different tests. The first alternative is to calculate an exact standard score equivalent (with a mean of 100 and SD 15). This is the most precise alternative.

Conversion of the Griffiths scale scores into standard scores can be carried out using a simple transformation algorithm,

$$SS_2 = M_2 - \left(\frac{M_1 - SS_1}{SD_1} \times SD_2 \right)$$

where SS_2 is the new adjusted standard score (M 100, SD 15), M_2 is the mean of the normal standard score (100), M_1 is the mean for the Griffiths subscale or GQ, SS_1 is the Griffiths standard score, SD_1 is the standard deviation for the Griffiths' subscale or GQ and SD_2 is the normal standard deviation (15).

The second option is to develop descriptive category ranges for Griffiths scores that are equivalent to those used by other tests. Table 2 uses standard score ranges ($\pm 2SD$) that are based on those used by popular tests with a mean of 100 and SD 15, for example, the Wechsler Preschool and Primary Scale of Intelligence—revised,³ and the British Ability Scales II.⁴ Descriptive terms for the score ranges, such as "borderline" or "low" for scale scores of 70–79, and "normal" or "average" for scaled scores of 90–109, refer implicitly to this shared standard. The same score ranges are used by the Bayley Scales of Infant Development.⁵

Table 3 shows the downward extension of these ranges, with the Griffiths scale score bands for the ICD10⁶ mental retardation ranges. The table highlights the difference between Griffiths subscale scores at the extreme ranges.

These tables and transformations are suggested as simple corrections to potential interpretation error based on the traditionally derived Griffiths standard scores.

Table 1 Griffiths 2–8 scale means and standard deviations²

Griffiths scale	Mean	SD
Total scale (GQ)	100.18	12.76
Locomotor development	100.41	16.32
Personal-social development	100.26	16.20
Hearing and speech	99.78	17.75
Hand and eye coordination	100.46	15.58
Performance tests	99.87	17.21
Practical reasoning	99.79	17.43

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Table 2 Griffiths scale score equivalents for standard score ranges

Griffiths scale	Verbal descriptors for Griffiths score bands (standard score ranges, M 100, SD 15)						
	Very low (<70)	Low (70–79)	Low average (80–89)	Average (90–109)	High average (110–119)	High (120–129)	Very high (>129)
Total scale (GQ)	<75	75–82	83–91	92–108	109–116	117–125	>125
Locomotor development	<68	69–78	79–88	89–110	111–121	122–132	>132
Personal-social development	<68	69–78	79–88	89–110	111–121	122–132	>132
Hearing and speech	<64	64–75	76–87	88–110	111–122	123–134	>134
Hand and eye coordination	<69	69–79	80–89	90–110	111–120	121–131	>131
Performance tests	<65	65–76	77–87	88–110	111–122	123–133	>133
Practical reasoning	<65	65–75	76–87	88–110	111–122	123–133	>133

Table 3 Griffiths scale score band equivalents for ICD10 ranges of mental retardation

Griffiths scale	ICD10 levels of mental retardation (standardised score range)			
	Profound (<20)	Severe (20–34)	Moderate (35–49)	Mild (50–69)
Total scale (GG)	<32	32–44	45–57	57–74
Locomotor development	<13	13–29	30–45	46–67
Personal–social development	<14	14–29	30–45	46–67
Hearing and speech	<5	5–22	23–39	40–63
Hand and eye coordination	<17	17–32	33–47	48–68
Performance tests	<8	8–24	25–41	42–64
Practical reasoning	<7	7–23	24–41	41–64

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IMAGES IN PAEDIATRICS**Lung abscess complicating post-varicella pneumonia**

A previously healthy 2½ year old boy with varicella infection presented five days later with high fever, productive cough, and dyspnoea.

On admission, he had signs of respiratory distress and poor perfusion. He was pale and dyspnoeic, with a temperature of 41.2°C and 96% saturation in room air. Lung auscultation revealed bronchial breath sounds in the right upper field. Resolving lesions typical of varicella were seen on skin examination. The rest of the physical and neurological examination was normal. Chest x ray showed consolidation in the right upper lobe with air bronchogram. A diagnosis of lobar bronchopneumonia was made and IV ceftriaxone was started.

On day 5, chest x ray showed an airspace cavity with air fluid level at the anterior segment of the right upper lobe. On lateral decubitus a shifting of the same level was noted, indicating a free fluid containing cavity (figs 1 and 2). Antibiotic treatment was continued for four weeks, leading to complete

clinical resolution. No invasive procedure was performed. Chest x ray performed three months after admission was unremarkable.

Lung abscesses are circumscribed, thick walled cavities in the lung containing purulent material. Diagnosis is usually made on the basis of characteristic roentgenographic findings. The abscess cavity becomes visible when air entering from the bronchus creates an air–fluid level over the pus and may be missed if only a supine film is taken.

Asher and Levershe' noted that the roentgenographic appearance of a lung abscess is often dramatic and may therefore cause considerable alarm and lead to overtreatment. They argue that "children with a lung abscess usually do well with antibiotic therapy alone, and it is unusual to require other therapy".

In our patient, the lung abscess followed a varicella infection. Conservative treatment with intravenous antibiotics for four weeks led to a complete recovery.

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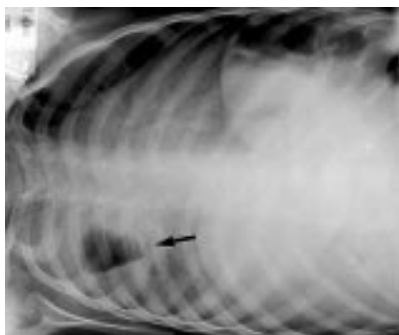


Figure 1 Horizontal beam anteroposterior chest x ray at right lateral decubitus showing air and solid material filling the lesion in the anterior segment of the right upper lobe.



Figure 2 Anteroposterior and lateral chest x ray showing air fluid level into the cavity, as seen on day 14 after admission. Note the small amount of free pleural effusion in the right pleural cavity.