

Specific Language Impairment can be predicted using language milestones

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Objective

The aim of this study was to develop a concise tool to identify children with Specific Language Impairment (SLI) by using language milestones.

Design and statistical analysis

In a nested case-control study cases were children aged 4-11 years old attending special schools for severe speech and language difficulties in the Netherlands. These children were matched for gender and date of birth with control children who attended mainstream education. Outcomes (fail or pass) of six language milestones from the Dutch Developmental Instrument at the age visits of 24 (two milestones), 36 (two milestones) and 45 months (two milestones) were retrieved from the well-child care health system (see Table 1). The predictive validity was assessed using combinations of two language milestones at each age and all six milestones combined. Multiple imputation was applied to adjust for missing values.

Results

Data on 253 cases and 253 controls were available. Combinations of two milestones at a single visit had specificity rates ranging from 85-100% and sensitivity rates ranging from 26-78%. However no included combination of two milestones had acceptable rates for both specificity (≥90%) and sensitivity (≥70%) (See Table 2). At the age of 36 months the milestone speech is understood by acquaintances did not contribute much to the detection of more children with SLI and was therefore excluded from the tool. The combination with the optimal predictive value, i.e. a sensitivity of 71% at a specificity of 96%, is shown in Figure 1. When accepting a lower specificity a combination was found with only four milestones at different ages with a sensitivity of 77% and a specificity of 94%.



Table 1 Number of children with available data at each age visit

Age in months	milestone	Cases n	Controls n
24	A Says two-word “sentences”	226	244
	B Points at six parts of a doll’s body	204	220
36	A & B	203	219
	C Says “sentences” of three or more words	200	226
	D Speech is understood by acquaintances	203	238
	C & D	194	220
45	E Talks spontaneously about events at home/playground	88	130
	F Asks questions about “who”, “what”, “where” and “how”	101	122
	E & F	76	115

Table 2 Validity of combinations of two milestones at each age visit based on the imputed data (n=253 controls, n=253 cases)

Age point (months)	Milestones	Sensitivity % (95%CI)	Specificity % (95%CI)
24	A-	72.1 (66.6-77.7)	88.2 (84.2-92.2)
	B-	37.5 (31.5-43.5)	94.2 (91.3-97.1)
	A- or B-	77.8 (72.6-82.9)	85.3 (80.9-89.7)
	A- and B-	31.9 (26.1-37.6)	97.1 (95.0-99.2)
36	C-	49.3 (43.1-55.5)	99.5 (98.7-100.0)
	D-	55.8 (49.7-61.9)	97.1 (95.0-99.2)
	C- or D-	64.2 (58.3-70.2)	96.6 (94.4-98.8)
	C- and D-	40.9 (34.8-47.0)	100.0 (98.3-100.0)
45	E-	51.5 (45.2-57.7)	97.5 (95.6-99.5)
	F-	56.4 (50.2-62.6)	96.8 (94.6-99.0)
	E- or F-	63.7 (57.7-69.7)	94.9 (92.2-97.6)
	E- and F-	44.2 (38.0-50.4)	99.4 (98.5-100.0)

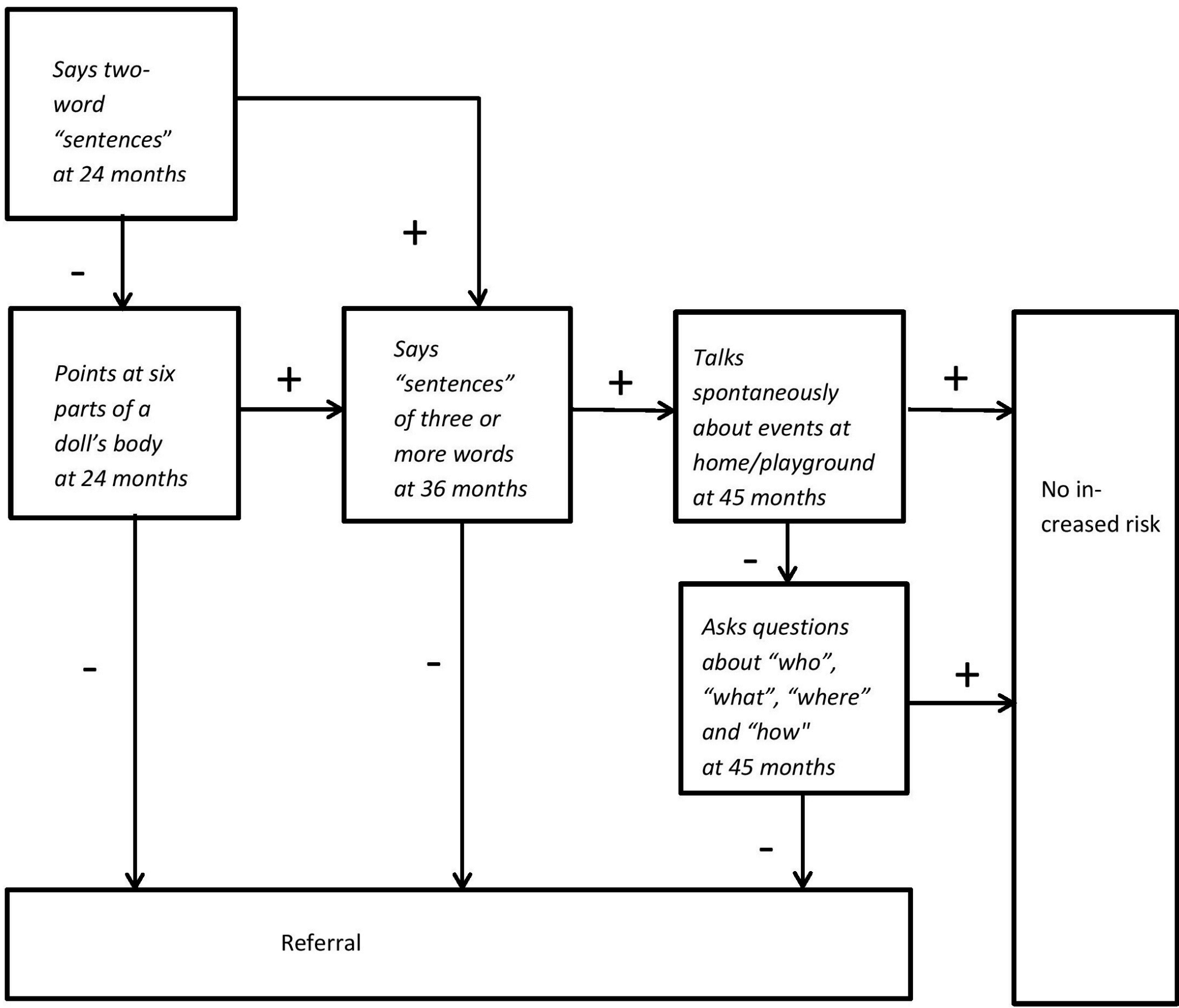


Figure 1 Flow chart with optimal scenario with five milestones (sensitivity of 71% and a specificity of 96%)

Conclusion

Many children with SLI can be identified before the age of four years old using language milestones at each visit at 24, 36 and 45 months of age. This easy to use tool can be helpful for professionals to detect which children need further investigation.

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