Children with developmental language delay at 24 months of age: results of a diagnostic work-up

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The aim of this study was to evaluate if a diagnostic work-up should be recommended for 2-year-old children with developmental language delay (LD), or if the widely chosen 'wait and see' strategy is adequate. Children with LD were identified in paediatric practices during routine developmental check-ups using a German parent-report screening questionnaire (adapted from the MacArthur Communicative Development Inventories). A standardized German instrument and the Netherlands version of Bayley Scales of Infant Development (2nd edn) were used to assess language ability and nonverbal cognitive development respectively in 100 children with LD (65 males, 35 females; mean age 24.7mo [SD 0.9]) and a control group of 53 children with normal language development (33 males, 20 females; mean age 24.6mo [SD 0.8]). Neurological and audiometric testing were also performed. Sixty-one per cent of the LD group had specific expressive LD and 17% specific receptive-expressive LD. In 22%, LD was associated with other neurodevelopmental problems, 6% showed significant deficits in nonverbal cognitive abilities, and in 12%, nonverbal cognitive abilities were borderline. Four per cent fulfilled the criteria of childhood autism. LD at 2 years proved to represent a sensitive marker for different developmental problems. Adequate early intervention requires a clear distinction between specific expressive or receptive-expressive LD and LD associated with other neurodevelopmental problems. Though catch-up development is to be expected in a substantial proportion of 'late talkers', our data demonstrate that a general 'wait and see' approach is not justified in young children with LD. A proposal for a rational diagnostic work-up is presented.

Language delay (LD) in young children is a very common problem. Using the widely accepted criterion of a parent-reported expressive vocabulary of less than 50 words and/or no word combinations, the prevalence of LD is estimated to be approximately 15% at the age of 24 to 29 months.[1,2]

Consequently, there is a great need for guidelines to deal with this prevalent problem, which is often detected within the context of regular paediatric developmental check-ups. A widely-chosen approach by paediatric practitioners is the 'wait and see' strategy which is based on the fact that language development is still quite variable at 2 years of age, and also that results of earlier studies indicate that about half of children with LD at 2 years old are thought to catch up to their peers by 3 years of age.[3] As a result of the popularity of this approach, most children with LD do not get further diagnostic work-up at the age of 2 or 3 years.[4]

Children with isolated expressive LD have a good prognosis;[3,5] however, early LD can be an indicator for several neurodevelopmental problems. First, LD can reflect specific language impairment (SLI). Children with SLI have either expressive language lags or they exhibit deficits in both expressive and receptive language abilities. Second, LD can be caused by neurological disorders, or be associated with general cognitive impairment.[6,7] Third, LD can be an initial symptom of an autism spectrum disorder.[7] In children with autism, late onset of speech is often the first reason for consulting a paediatrician.[8] In addition, hearing loss is a frequent and usually easily treated condition in children; persisting hearing loss can affect speech, language, and social, emotional, and cognitive development. The most common cause of acquired hearing loss in childhood is persistent otitis media with effusion (OME). Its prevalence is between 15 and 40% in healthy children from infancy to 5 years of age.[9,10]

As all these conditions need a specific diagnostic work-up and require medical treatment or early intervention, it seems important for paediatricians to go beyond a 'wait and see' approach.

In Germany, 10 paediatric developmental check-ups are provided free for every child, at various ages. The seventh check-up (called U7) is carried out between 21 and 24 months of age. This age range is appropriate for the early identification of children at risk of language impairment, using the above mentioned 50-word criterion. In Germany, language development can be assessed with the ELFRA-2[11] (German adaptation of the MacArthur Communicative Development Inventories[12]), a reliable and easy-to-use parent-report screening instrument.[2]

The purpose of this study was to perform and analyze an extensive diagnostic work-up in a group of children with LD, identified at the routine developmental check-up at 21 to 24 months, in order to develop a rational procedure to deal with early developmental LD. We examined receptive and expressive language abilities as well as nonverbal cognitive abilities and hearing in a group of otherwise unremarkable children with LD ('late talkers') and compared the results with a control sample with normal language development (LN). The study was performed between October 2003 and February 2006.

Method

PARTICIPANTS

In order to recruit children with LD, all general paediatric practices in the regions of Heidelberg and Mannheim

(n=96), Germany, covering an area with 1 million inhabitants, were asked to participate in the study. Forty-six paediatricians consented to participate. They selected children during the developmental check-up at 21 to 24 months of age according to the following criteria: singletons born at term without pre-, peri-, or postnatal complications; German-speaking home background; no general developmental delays; no known chronic hearing deficits; no visual impairments; and no genetic syndromes or other diseases with a known influence on language development. Parents completed the ELFRA-2[11] parent-report screening instrument. One hundred and forty-seven children with LD were identified. Thirty parents (20.4%) refused to take part in the study, mainly because they were not concerned about the LD of their child. Seventeen families (10.5%) did not complete the diagnostic procedures, mainly due to the children's lack of cooperation in the first diagnostic session. Thus, the final study sample consisted of 100 children with LD. To obtain a control group of children with LN, advertisements were placed in a local newspaper. A total of 53 children with LN were matched as closely as possible with respect to sex, age, birth order, and maternal school education.

MEASURES

Each child was seen for an initial evaluation which was completely recorded on videotape. In the first session, children were tested with the widely-used developmental language test for 2-year-old children (SETK-2),[13] a standardized and norm-referenced instrument to examine the language status of

Table I: Demographic and clinical data of children with language delay (LD) and normal language development (LN)

	Groups			
	LD children (n=100) (65 males, 35 females)	LN children (n=53) (33 males, 20 females)		
Maternal school education (yrs in school), %			p=0.548	ns (Fisher's exact test)
No/Low graduation (8–9)	17	18		
Middle school graduation (10)	40	42		
High school graduation (13)	43	40		
Age of mothers at birth, mean (SD) y:mo	32:9 (4:5)	31:9 (4:4)		
Birth order, %			p=0.749	ns (Fisher's exact test)
First born	30	40		
Second born	55	51		
Third or fourth born	15	9		
Family risk for SLD (1st degree), %	40	4	**p<0.001**	(Fisher's exact test)
Birthweight, mean (SD) g	3534 (472)	3473 (503)	t=0.72	p=0.472 (t-test)
Growth parameters at 2y, mean (SD)				
Weight, kg	12.8 (1.6)	12.2 (1.3)	t=2.5	**p=0.015** (t-test)
Height, cm	88.1 (4.4)	87.1 (3.4)	t=1.6	p=0.122 (t-test)
Head circumference, cm	49.1 (1.3)	49.8 (5.3)	t=–0.9	p=0.357 (t-test)

Bold type indicates statistical significance. SLD, speech and language disorder; ns, not significant.

Table II: Group scores on subtests of SETK-2 and BSID-II-NL for total language delay (LD) and normal language development (LN) groups and for subgroups of LD children

							Subgroups of LD children							
	Total LD (n=100)		Total LN (n=53)				Specific LD (n=78)		SELD (n=61)		SRELD (n=17)		LD/CI[d] (n=18)	
	M	SD	M	SD	t	p[c]	M	SD	M	SD	M	SD	M	SD
SETK-2														
Age, mo	24.7	0.9	24.6	0.8	0.5	0.638	24.7	0.9	24.7	0.9	24.7	0.9	24.9	1.1
Comprehension[a]														
Word comprehension	47.7	9.5	56.1	7.6	–6.4	<0.001	49.3	8.6	51.2	8.0	42.6	7.4	40.7	8.8
Sentence comprehension	44.3	10.8	56.4	11.1	–6.4	<0.001	47.2	9.7	50.5	8.0	35.8	5.2	34.8	7.9
Production[a]														
Word production	30.5	3.7	56.8	9.4	–33.4	<0.001	30.9	3.6	31.0	3.5	30.4	3.8	29.3	3.9
Sentence production	34.6	3.8	54.4	7.6	–15.2	<0.001	35.3	3.6	35.8	3.5	33.5	3.6	33.0	4.1
BSID-II-NL[b]														
MDI	89.6	10.9	113.1	11.6	–12.1	<0.001	95.9	7.4	95.0	7.4	88.0	7.5	74.2	6.5
Nonverbal-MDI	101.7	19.1	114.9	12.9	–5.0	<0.001	110.9	11.8	110.9	11.8	103.8	11.4	71.4	10.1

aT score normative means are 50 (SD 10). bStandard score normative means are 100 (SD 15). cAdjusted for multiple testing using Bonferroni corrections. dFour children with autism excluded. SETK-2, [Developmental language test for 2-year-old children];[13] BSID-II-NL, Bayley Scales of Infant Development, 2nd edn, Netherlands version;[14] SELD, specific expressive language delay; SRELD, specific receptive-expressive language delay; LD/CI, Language delay associated with cognitive impairment; MDI, mental development index.

German-speaking children between 24 and 35 months of age. Two subtests of the SETK-2 measure language comprehension through the recognition of single words and simple sentences using pictures (reliability coefficients 0.28–0.70). Two subtests measure word production (naming of objects and pictures) and sentence production (explaining pictures; reliability coefficients 0.88–0.95[13]). The word production subtest turned out to be especially predictive for further language development (e.g. correlation $r=0.82$ with nonword-repetition at 3y[13]). In the second session, children were tested with the Mental scale of the Bayley Scales of Infant Development, 2nd edition, Netherlands version (BSID-II-NL).[14] For testing at the age of 2 years, the Netherlands version offers norms for a general Mental Development Index (MDI) and for a nonverbal-MDI, which refers to the nonverbal items of the Mental scale. The assessors were blind to the group status of the children.

Parents completed a questionnaire regarding social and family variables and participated in a semi-structured interview on the family and the child's developmental history.

The routine children's check-up at the age of 2 years does not include an obligatory hearing screening. Therefore, supplementary audiometric testing was scheduled for all participants (otoscopic inspection of the tympanic membrane, impedance measurement, hearing threshold determination, play, or conventional audiometry). Children with a hearing loss ≤20dB were considered to have normal hearing and children with a hearing loss >20dB were considered to have reduced hearing. The examiners were not blind to the group status of the children.

To exclude children with neurological diseases, a neurological examination was performed by an experienced paediatric neurologist.

STATISTICAL ANALYSIS

Statistical analysis was performed using SAS (version 8.01). Procedures to calculate means and frequencies were used. χ^2 or the Fisher's exact test were applied to test for frequency differences between groups. Two-sided t-tests and analysis of variance (ANOVA) were administered. Statistical significance was set at $p \leq 0.05$. A posteriori Bonferroni t-tests were computed to check for pair-wise differences.

The study was approved by the ethics committee of the University of Heidelberg. The experimental protocol was explained to all parents and their written informed consent was obtained.

Results

DEMOGRAPHIC CHARACTERISTICS

Demographic and clinical characteristics of the LD group ($n=100$) and the LN group ($n=53$) are shown in Table I. The rate of family history of language impairment was significantly higher in the LD group (40%) compared with the LN group (4%; Fisher's exact test $p<0.001$). Mean values for weight, height, and head circumference at 2 years of age were normal for both groups compared with centiles of the general population. Mean value for weight was slightly increased in the LD group in comparison to the LN group. Neurological diseases were not detected in either group.

LANGUAGE DEVELOPMENT

For screening purposes, parents completed the ELFRA-2 questionnaire when their children were between 21 and 24 months of age during the children's routine developmental check-up. Mean word production was 15 words (SD 10.9, range 0–47) in the LD group and 161 words (SD 44.6, range 81–260) in the LN group ($t=-23.4$; $p<0.001$).

At the time of the standardized examination of language development, children were between 24 and 27 months old. All 100 LD children (vocabulary<50 words, ELFRA-2) showed subnormal results at least in one production subtest (>1SD below mean) and all 53 LN control children showed normal results in both production subtests of the SETK-2. Thirty-five of the LD children (35%) attained subnormal results in at least one of the two comprehension subtests, but only two of the children in the LN group.

The LD group scored significantly lower than the LN group in both comprehension subtests as well as in both production subtests ($p<0.001$; Table II).

COGNITIVE DEVELOPMENT

Cognitive development was assessed using the Mental scale of the BSID-II-NL. The test was fully completed by 98 LD children (two children did not cooperate) and all 53 LN children. In the LD group, the mean MDI score of 89.6 was lower than the nonverbal-MDI score of 101.7 (Table II). In the LN group the mean MDI score did not differ significantly from the mean nonverbal-MDI score. The LD group scored significantly lower compared with the LN group on the MDI and on the nonverbal-MDI (($p<0.001$; Table II).

HEARING IMPAIRMENT

The otological examination was completed for 96 LD and 41

Table III: Pair-wise group comparisons using a posteriori Bonferroni t-tests

Pair-wise group comparisons	Comprehension				Production				Nonverbal cognitive development			
	Difference between mean values	Low	High	p	Difference between mean values	Low	High	p	Difference between mean values	Low	High	p
LN-SELD	5.4	1.9	8.8	[a]	22.2	19.5	24.9	[a]	2.7	–1.3	6.7	ns
LN-SRELD	17.1	12.0	22.2	[a]	23.7	19.7	27.7	[a]	7.2	1.2	13.2	[a]
LN-LD/CI	18.6	13.5	23.7	[a]	24.5	20.5	28.5	[a]	29.0	23.0	35.0	[a]
SELD-SRELD	11.7	6.7	16.7	[a]	1.4	–2.5	5.4	ns	4.5	–1.4	10.4	ns
SELD-LD/CI	13.2	8.2	18.2	[a]	2.3	–1.6	6.2	ns	26.3	20.5	32.2	[a]
SRELD-LD/CI	1.5	–4.8	7.8	ns	0.8	–4.1	5.7	ns	21.8	14.5	29.2	[a]

[a]$p<0.001$; LN, normal language development; SELD, specific expressive language delay; SRELD, specific receptive-expressive language delay; LD/CI, language delay with associated cognitive impairment; ns, not significant.

LN children. Four parents of the LD group and 12 parents of the LN group declined to participate in audiometric testing. Forty-one (42.7%) children with LD had a uni- or bilateral middle ear ventilation disorder. Sixteen of them suffered from middle ear effusion: one child unilateral and 15 children bilateral. These 15 children underwent subsequent tympanostomy. Surgery was implemented with bilateral short-term ventilation tube insertion and adenoidectomy. The one child with unilateral OME underwent paracentesis.

In the 41 children with LN examined, the rate of uni- or bilateral middle ear ventilation disorder (n=10, 24.4%) was significantly lower compared with the group of LD children ($\chi^2[1]=4.1$, $p=0.04$). One of the LN group suffered from middle ear effusion and underwent bilateral tympanostomy.

LD associated with other neurodevelopmental problems

Cognitive impairment

Seventeen out of 98 LD children had a subnormal nonverbal-MDI (BSID-II-NL) score of less than 85 (mean 100, SD 15), but only one of the children with LN did (nonverbal-MDI 78). Five of the 17 children showed substantial deficits in nonverbal cognitive abilities (<70), while 12 children exhibited borderline nonverbal cognitive abilities (70–84). Another child, who did not complete the BSID-II-NL, was clinically assessed by developmental psychologists as being significantly impaired in cognitive development. In total, 18 children (18%) in the LD group had associated cognitive impairment; 14 of them showed subnormal results in at least one of the two comprehension subtests of the SETK-2.

Autism

Four children of the LD sample (4%) fulfilled the diagnostic criteria of childhood autism (International Statistical Classification of Diseases, 10th revision[15] [ICD-10] code, F84.0). Two children had a nonverbal-MDI<70 (not included in the above-mentioned group of the 18 LD children with associated cognitive impairment). One child reached a nonverbal-MDI score in the normal range. One child with autism was not able to complete the test, but was clinically assessed as normally developed in cognitive abilities. All the children with autism showed subnormal results in at least one of the two comprehension subtests. None of the four children with autism had hearing impairments. They were referred to a specialized autism centre for further diagnosis and treatment.

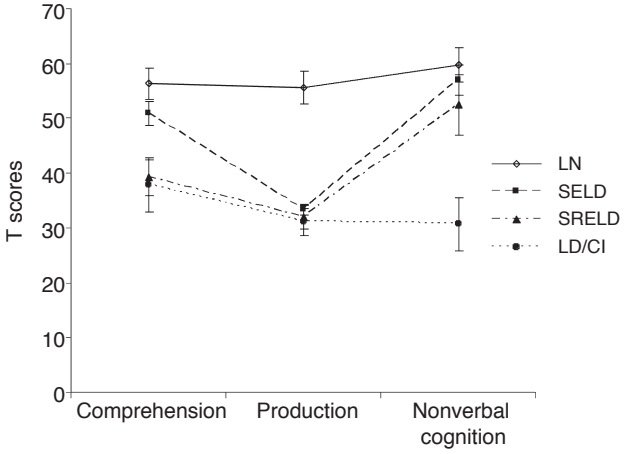

Figure 1: T scores (mean value [symbols], 99% confidence interval [vertical lines]) for comprehension, production, and nonverbal cognitive development in children with normal language development (LN), specific expressive language delay (SELD), specific receptive-expressive language delay, (SRELD), and language delay with associated cognitive impairment (LD/CI).

Receptive LD

Eighteen of the 35 children (51%) with subnormal results in one of the two comprehension subtests of the SETK-2 had an associated cognitive impairment (nonverbal-MDI<85) or fulfilled the criteria of childhood autism, whereas only four of the 65 children (6.2%) with normal receptive language abilities showed associated cognitive impairment ($\chi^2[1]=27.2$, $p<0.001$).

Comparison between three subgroups of LD children

After excluding the four children with autism, participants were classified into three LD subgroups according to the results on the nonverbal-MDI of the BSID-II-NL, and on the comprehension subtests of the SETK-2: 61 children had specific expressive LD (SELD), 17 children had specific receptive-expressive language delay (SRELD), and 18 children had LD with associated cognitive impairment (LD/CI). Demographic and clinical data were comparable. The groups did not differ on sex, birth order, mother's school education, and rate of family history of language impairment. Audiometric testing, the rate of OME, and the rate of children who underwent subsequent tympanostomy were comparable for the LD subgroups.

Screening data showed an average expressive vocabulary (ELFRA-2) of 16 words (SD 10.9) in the group of 61 children with SELD, 16.8 words (SD 11.8) in the group of 17 children with SRELD, compared with 10.3 words (SD 8.8) in the group of children with LD/CI (ANOVA, $F[2, 93]=2.2$, $p=0.1$).

Figure 1 shows mean and 99% confidence intervals of test scores of the LN and all three LD subgroups. The two comprehension and two production subtests of the SETK-2 were combined. There is a significant group effect ($F(3,144)=131.7$, $p<0.001$) as well as a significant test effect ($F(2, 288)=108.5$, $p<0.001$) and a significant interaction between group and tests ($F(6, 288)=42.4$, $p<0.001$; ANOVA with repeated measurement adjusted by Greenhouse-Geisser). A posteriori Bonferroni t-tests revealed that all three LD subgroups differed significantly from the LN control group on comprehension and production. On nonverbal cognitive development, only the SRELD group and the LD/CI group differed significantly from the LN group. On production, the three LD subgroups did not differ significantly, but on comprehension the SRELD and the LD/CI group differed significantly from the SELD group. On nonverbal cognitive development, the LD/CI group differed significantly from SELD and SRELD group (Table III).

Discussion

Our study demonstrated that early expressive LD is a valid and useful indicator of specific developmental language disorders and general neurodevelopmental problems. The results of an extensive diagnostic work-up of 100 children with LD, screened at 2 years of age on the basis of a parent questionnaire regarding expressive vocabulary, have important implications

for dealing with this frequent problem: only about half of the 'late talkers' had an isolated delay in expressive language abilities which has an overall good prognosis.[3,5] All others showed additional deficits in receptive language abilities and/or nonverbal cognitive impairment, or serious developmental problems (childhood autism).

Compared with the general prevalence of childhood autism (ICD-10 code F84.0) of 0.2 to 0.4%, and a total prevalence of approximately 1% of all autism spectrum disorders,[16] the frequency in our sample of children with LD is very high (4%). As LD is a typical feature of childhood autism, it is unsurprising and consistent with other findings[7] that the prevalence in a selected group of children with LD is substantially higher compared with the general population.

A high rate of children with language-impairment and additional cognitive impairment has also been found in several studies.[6,7,17] Due to the poorer prognosis,[5] it is necessary to identify such children as early as possible. The parents need adequate consultation while the children require early intervention or special education.[18]

However, in paediatric practices, formal cognitive testing is usually not applied to the majority of children identified as language-delayed because testing them is time-consuming and difficult. Results of our study showed that nonverbal cognitive development should specifically be considered as it permits a clear distinction between children with specific LD and children with co-occurring cognitive impairment. This is possible with the Netherlands version of the BSID-2,[14] which includes a nonverbal scale with Dutch norms for 2-year-old children.

Results of the language comprehension tests underscore the necessity for a standardized investigation of receptive language abilities of children with LD, because they are at a significantly higher risk for having persisting language, literacy, and behavioural problems in later childhood and adult life,[19,20] and for having cognitive impairment, or even autism.

In our study, the rate of children with LD with persistent OME was increased compared with the LN group. There has been a controversial debate about the causal relationship between otitis media early in life and later developmental impairments. As the prospective study of Paradise et al.[21] found no association between persistent OME and later language, cognitive, and psychosocial development at the age of 3, 4, 6, and 9 to 12 years, tympanostomy does not seem to be necessary for otherwise healthy children.[22] However, the effects of persistent OME with reduced hearing in children at risk of speech, language, or cognitive disorders remains unclear. Therefore treatment is usually recommended.

Paediatric practitioners play a pivotal role in early detection and of intervention for young children with developmental impairments. In Germany, more than 90% of parents take advantage of the check-ups in the first 2 years,[23] about 80 to 85% at the age of 4 and 5 years, with a lower rate in parents of low socioeconomic status and immigrants (approx. 60%[24]). But the efficacy of the check-ups is scarcely investigated and the findings are disillusioning. Riegel et al.[25] found that only about 50% of children with learning disability* (IQ<70) were detected until the age of 4 to 5 years during

*North American usage: mental retardation.

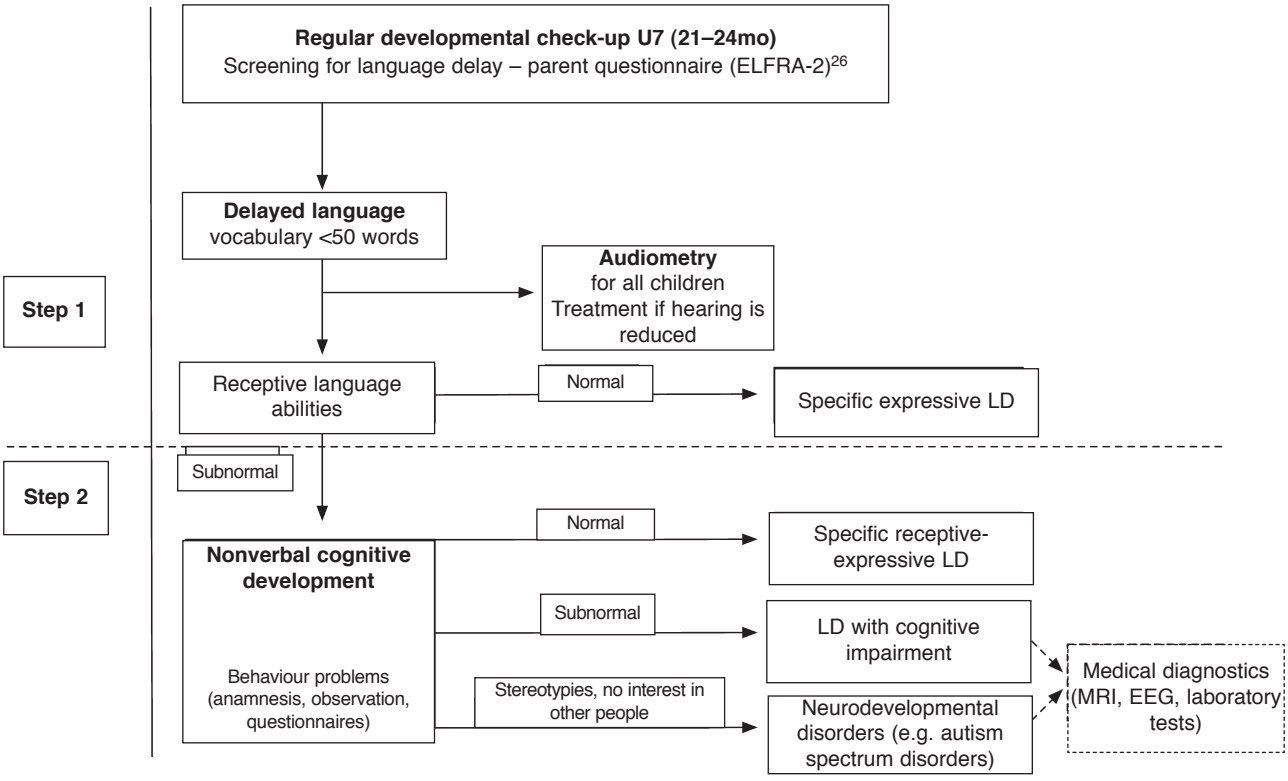

Figure 2: Proposal for a pragmatic diagnostic work-up for children with language delay (LD). MRI, magnetic resonance imaging; EEG, electroencephalogram.

the check-ups. Only one in four children with LD was detected at check-up U7 at the age of 21 to 24 months.[2] For the early identification of children with LD, the additional use of language-screening instruments as a matter of routine seems to be useful. The parent-report screening questionnaire ELFRA-2, which was constructed especially for paediatric practices is easy-to-use, well-accepted, and suitable for identifying children with LD.[2] There is also a short version,[26] which parents can complete while they are waiting for their child to finish the check-up. On the basis of our study results, if the reported vocabulary is lower than 50 words at the age of 24 months, further investigation is recommended. An extensive diagnostic work-up as in our study is time-consuming and cost-intensive. In light of our results, we propose a pragmatic diagnostic scheme (Fig. 2), which includes obligatory audiometry to rule out hearing loss and standardized assessment of receptive language abilities (step 1). Further investigation of nonverbal cognitive development and behaviour (step 2) is important if receptive language abilities are delayed. During the diagnostic work-up other neurodevelopmental impairments, such as autistic spectrum disorders, should become evident. As there is evidence that early intervention in children with global developmental delay, as well as specific LD, can improve functional outcomes and reduce secondary behavioural problems,[27] treatment should start as early as possible.

On the basis of our pilot study, a more rigorous epidemiological study seems to be warranted to confirm our results and to evaluate further the efficacy of the proposed diagnostic work-up for children with early LD.

Conclusions

Our results clearly point out the necessity of not choosing a 'wait and see' strategy, but rather taking early LD seriously. It was shown that a substantial proportion of children had additional deficits in receptive language abilities, treatable hearing problems, and neurodevelopmental problems. We propose the routine use of language-screening by parent questionnaires at the developmental check-up at the age of 2 should be followed by a careful diagnostic work-up after positive screening results. This is an important prerequisite to consulting parents adequately and providing effective early intervention.

Accepted for publication 21st August 2007.

Acknowledgements

This study was supported by Leopold-Klinge-Foundation, CD-Foundation, Günter Reimann-Dubbers-Foundation, and Zonta-Club Heidelberg. We also thank Professor Hannelore Grimm for her help in planning the study.

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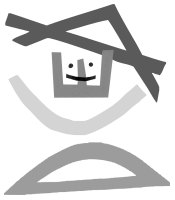
List of abbreviations

BSID-II-NL	Bayley Scales of Infant Development, 2nd edn,. Netherlands version
ELFRA	[Parent report screening questionnaire for early identification of children at risk]
LD	Language delay
LD/CI	Language delay with associated cognitive impairment
LN	Normal language development
MDI	Mental Development Index
SELD	Specific expressive language delay
SETK-2	[Developmental language test for 2-year-old children]
SRELD	Specific receptive-expressive language delay

EPNS

European Academy of Childhood Disability
20th Annual Meeting
Early Diagnosis Implies Early Intervention

Zagreb June 5–7 2008



The programme of the meeting will address the theme of *Early diagnosis implies early intervention* which we believe might ensure better functional recovery.
It will be a joint meeting of the EACD and European Paediatric Neurology Society (EPNS). Being able to benefit from the expertise of both societies certainly will result in high-level scientific contributions.

All topics of the programme will be presented by keynote lectures, parallel sessions, lectures, dedicated papers, and posters, as well as workshops and instructional courses.
Satellite symposia arranged by EACD/EPNS will precede the official programme of the meeting. Also, Parent Associations will contribute to the pre-conference events enriching the programme by their satellite symposia.

Topics:

- Neurobiology of brain development, early brain damage, and plasticity
- Neurobiology and therapy of autistic spectrum
- Perinatal infection and childhood disability
- Childhood stroke – from perinatal period onwards
- Early communication and disorders

Keynote lectures:

- MR imaging of the connectivity-related cellular zones in developmental cerebrum of human fetus and preterms
- Consequences of early brain lesions and plasticity
- Basic mechanism of early communication disorder
- Perinatal infection and outcome
- Pathogenesis of stroke in children
- Mirror neurons, embodied simulation, autismus

Members are invited to apply to present an Instructional Course or an Oral Presentation on a specific topic in the scientific programme. New to the programme is the session 'Meet the expert'.
We look forward to welcoming you to Zagreb and Croatia in 2008!

On behalf of the Organizing Committee;

Vlatka Mejaški-Bošnjak

For more information see the website: www.eacd2008.com