A Comparison of Intelligence and Social Maturity in Children with Unilateral Complete Clefts and Those with Isolated Cleft Palates

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Intelligence and social development were evaluated in 226 subjects with palatal clefts. The subjects were divided into four groups composed of 111 with unilateral complete clefts of the lip and palate (Unilateral Group); 16 with unilateral complete clefts with associated congenital malformations (Unilateral-C Group); 76 with clefts of the palate only (Palatal Group); and 39 with clefts of the palate only with other congenital malformations (Palatal-C Group). Comparisons among groups suggested that subjects in the Unilateral Group were most competent both mentally and socially followed by those in the Palatal, Unilateral-C, and Palatal-C Groups. The presence of congenital abnormalities other than cleft increased the risk of developmental disabilities, particularly in subjects with isolated palatal clefts.

Many studies have suggested that individuals with clefts have mean intelligence quotients (I.Q.'s) somewhat lower than the population mean (Billig, 1951; Means and Irwin, 1954; Munson and May, 1955; Illingsworth and Bush, 1956; Goodstein, 1961; Lewis, 1961; Drillien, Ingram, and Wilkinson, 1966). Ruess (1965) reported that, in comparison with their siblings, those with clefts were significantly lower in verbal and full-scale WISC I.Q.'s but did not differ in performance I.Q. The actual differences reported, however, were small. McWilliams and Musgrave (1972), using the Revised Stanford-Binet Intelligence Scale, Form L-M, and the Wechsler Intelligence Scale for Children, did not find reduced mean I.Q. in children with acceptable speech but did report a slightly lower, statistically significant, mean I.Q. when marked speech problems were present. These authors also found no evidence of the higher performance than verbal I.Q. previously reported (Goodstein, 1961; Ruess, 1965).

Goodstein (1961), in an attempt to learn something of the relationship between cleft type and intelligence, concluded that children with cleft palate only were significantly more impaired intellectually than were children with complete clefts of the lip and palate. He speculated that the reason for this might be the higher incidence of other congenital abnormalities in this group. Lewis (1961) presented data which lent support to this hypothesis.

Goodstein (1961) also reported that children with clefts were socially inferior to their non-cleft peers in the first five years of life but that these differences were not apparent in older children. This work, based on the Vineland Social Maturity Scale, was not related to cleft type. These findings are similar to those of Musgrave et al. (1975) relative to intelligence and psycholinguistic abilities, which also improved as the children got older. It should perhaps be pointed out that all psychological test instruments have a standard error of measurement so that retest information is expected to vary within that error either above or below the original score or I.O. It is not usual, however, to find the change in test performance occurring primarily in a single direction, in this case, upward. Thus, it seems logical to conclude that these children, studied longitudinally, did indeed tend to perform better when they were older than they did when they were younger.

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It is clear that there is still confusion about the developmental status of children with clefts, particularly as it relates to cleft type and to the presence or absence of other anomalies. The present study was designed to determine the extent to which children with isolated palatal clefts differ from children with unilateral complete clefts of the lip and palate both when there are and are not other congenital abnormalities. "Congenital abnormality" was defined, for purposes of this study, as any abnormal condition present at birth as diagnosed or described by an experienced pediatrician or plastic surgeon participating regularly in the Cleft Palate Center of the University of Pittsburgh and serving as members of the faculty of the School of Medicine. Evaluation by a pediatric geneticist was done when it was indicated. However, it is recognized that, had a pediatric geneticist routinely conducted all of the examinations, slightly different information on associated anomalies might have emerged. That was and is not possible for all patients seen, although a strong genetic component is available for problem cases.

Subjects

DESCRIPTION OF GROUPS. A total of 226 subjects with a mean age of 10 years participated in the study. Table 1 summarizes their clinical characteristics.

Ninety-five subjects had unilateral complete clefts of the lip and palate with no other known congenital abnormalities. This group is referred to as the "Unilateral Group," and they represented 86% of the 111 subjects with unilateral complete clefts. Their mean age was 10 years. Only 16 subjects (14%) with unilateral clefts also had other congenital abnormalities ("Unilateral-C Group"). Their mean age was 11 years.

There were 115 subjects who had palatal clefts posterior to the incisive foramen. Of these, 76 (66%) had no other congenital anomalies. They are hereafter designated as the "Palatal Group." Their mean age was 10 years. Thirty-nine of the 115 subjects (34%) with isolated palatal clefts also had other congenital defects. This group, designated the "Palatal-C Group," had a mean age of 9 years.

	Unilater	al Complete	Palate Only			
	Unilateral	Unilateral-C*	Palatal	Palatal-C*		
	Combin	ed N—111	Combin	ned N—115		
Number	95	16	76	39		
Percentage of Whole	86	14	66	34		
Mean Age in Years	10	11	10	9		
On State Cleft Program**	78	12	37	68		
Percentage	82	75	95	90		
Private Patients**	17	4	2	8		
Percentage	18	25	5	10		
Examined by Wechsler	95	15	72	29		
Percentage	100	94	96	74		
Verbal Behavior Present	95	15	74	34		
Percentage	100	94	99	87		
Mean Nasality Rating	2	2	2	2		
Range	1-3.5	2-4	1-3.5	1–4		
Mean No. Articulation Errors	28	34	30	43		
Range	0-166	0-142	0-142	1-160		
Mean No. Different Phonemes	5	7	6	9		
No. with No Errors	7	1	9	0		
Percentage	7	6	12	0		

TABLE 1. Description of Subjects

* "C" designates the presence of other malformations. Chi Square, significant beyond the .01 level of confidence, shows the higher occurrence in the Isolated Group.

** Chi Square between combined Unilateral and Palatal Groups was significant at the .05 level of confidence indicating that there were more private patients in the Unilateral than in the Palatal Groups.

SOCIOECONOMIC STATUS. No attempt was made to control for socioeconomic status since it was thought desirable to test as many subjects as possible. However, this aspect was explored. The number of subjects receiving State aid was compared with the number classified as private patients. It is interesting to discover that a higher proportion of subjects with isolated palatal clefts received State aid than was true for those with unilateral clefts. This difference was significant beyond the .05 level of confidence. In view of this, as will be seen later, certain test results were

compared in order to understand the possible effects of socioeconomic status. (See Table 1.)

NATURE OF ASSOCIATED ABNORMALITIES. Additional congenital abnormalities occurred significantly more often in subjects with isolated palatal clefts than they did in those with unilateral clefts as assessed by chi square (.01 level of confidence). (See Table 2.)

Eighteen per cent of the subjects in the Palatal-C Group were identified as having known syndromes, while syndromes never occurred in the Unilateral-C Group. Twice as many subjects in the Palatal-C Group had

	Palatal-C Group (N-39 of 115)*		Unilateral-C Group (N-16 of 111)*		
-	Number	Percentage	Number	Percentage	
Identified Syndromes	7	18	0	0	
Apert	1				
Ectodermal Dysplasia	1				
Klippel-Feil	1				
Moebius	1				
Otopalatal Digital	2				
Pierre Robin	11	28			
Without other defects	9				
With other defects	2				
Multiple Other Anomalies					
(excluding Syndromes and Pierre Robin)	6	15	3	19	
(including Syndromes and Pierre Robin with	15	38	3	19	
other defects)					
One Other Anomaly	15	38	13	81	
Nature of Other Anomalies (excluding Syndromes and Pierre Robin—Based on N of 23 for Pala- tal-C and 16 for Unilateral-C Group)					
Skeletal	16	70			
Neuromotor/Developmental Delay	8	35	1	6	
Fve	6	26	5	31	
Urogenital	6	26	0	0	
Heart	5	22	4	25	
Gastrointestinal	4	17	5	31	
Congenital Amputations	2	9	0		
Bilateral Choanal Atresia	1	4	0		
Unilateral Microtia	1	4	0		
Dermoid Cyst	1	4			
Severe Midline Tongue Groove	1	4	0		
Microstomia	1	4	0		
Excessive mucous in respiratory system from birth			1	6	
Retrognathia			1	6	
Fixation of Stapes			1	6	
Bilateral malformation of external auditory canal			1	6	
Very severe allergies			1	6	

TABLE 2. Summary of Associated Birth Defects

* A chi square of 11.63 indicates that other congenital anomalies occur significantly more often (P .01) in the isolated than in unilateral subjects.

multiple other anomalies than did the Unilateral-C Group.

Excluding specific syndromes and those with the Pierre-Robin Anomalad without other defects, 23 subjects in the Palatal-C Group shared a total of 52 other anomalies, or a mean of 2.26. The 16 subjects in the Unilateral-C Group, on the other hand, had a total of 20 problems other than the cleft, or a mean of 1.25.

In addition to these differences in the occurrence of other anomalies between the two groups, variations were also observed in the types of defects which were present (Table 2). For example, skeletal defects were never found in the Unilateral-C Group, but they were present in 16 of the 23 (70%) Palatal-C subjects who had neither specific syndromes nor the Pierre-Robin Anomalad without other deformities. Urinogenital defects were present in 26% of these Palatal-C subjects and were never found in the Unilateral-C Group, Gastrointestinal defects, on the other hand, accounted for 31% of the deformities in the Unilateral-C Group but for only 17% of those in the Palatal-C Group. In addition, in this connection, pyloric stenosis occurred in two subjects in the Unilateral-C Group, and this abnormality was never found in Palatal-C subjects. Conversely, congenital amputations were never seen in Unilateral-C subjects but occurred twice in the Palatal-C Group. Eye and heart defects were prominent in both groups but were more frequent in the Unilateral-C Group when the entire Palatal-C Group (n-39) was considered.

These data are reported here in an effort to describe this diversified population as thoroughly as possible. It would be necessary to extend the sample considerably in order to draw meaningful conclusions. However, the trends are sufficiently well defined to suggest the necessity for in-depth study in this area.

SPEECH CHARACTERISTICS. The children in all four groups were similar in ratings of hypernasality carried out by two speech pathologists using a seven-point scale with one representing normal resonance and seven severe hypernasality. In case of any disagreement, which was rare, the mean of the two ratings was used. Each of the four groups had a mean rating of two, indicating a very slight degree of hypernasality which was almost imperceptible. The range for the Unilateral and Palatal Groups was one to 3.5; for the Unilateral-C Group, from two to four; and for the Palatal-C Group, from one to four. Thus, none of the children in the study had severe hypernasality, and most had only very mild deviations in nasality.

Articulation was assessed using the 141item Templin-Darley Diagnostic Tests of Articulation (Templin and Darley, 1960). Each element in each blend was rated so that a total of 215 sounds were evaluated. Cost factors prevented having two examiners conduct each evaluation. Thus, it was necessary to depend upon previously established reliability in excess of .90 with precautionary spot checks throughout the study. Rigorous criteria were established so that the very slightest distortion was counted as an error.

Articulation errors were found in all groups. The Unilateral Group had a mean of 28 errors (13% of the sounds tested) and of errors on five different phonemes. The range of errors was from zero to 166. Seven of the subjects (7%) had no errors at all.

The Unilateral-C Group, on the other hand, had a mean of 34 errors (16%) and of involvement on seven different phonemes. The range was from zero to 142 total errors. One (6%) had no misarticulations.

The Palatal Group had a mean of 30 errors (14%), a range of zero to 142 total errors, and involvement on six different phonemes. On the other hand, nine (12%) had no discernable misarticulations.

The Palatal-C Group had poorer articulation than any of the others with a mean of 43 errors (20%), a range of one to 160, involvement on a mean of 9 different phonemes, and no subjects with unimpaired articulation.

While there was considerable overlap from one group to another, ranking on the basis of number of articulation errors places the Unilateral Group first, followed by the Palatal, the Unilateral-C, and the Palatal-C Groups.

HEARING. The subjects in this study all had pure-tone air and bone audiometric assessments on the day they came for psychological testing. Most of the children had air conduction thresholds, in the better ear, of 20 dB or below. However, bone conduction thresholds were invariably better than air, indicating very mild conductive losses. Speech reception thresholds, as measured by Central Institute for the Deaf Word List 22 for subjects whose speech was intelligible and by the Word Intelligibility by Picture Identification Test (Ross and Lerman, 1971) when speech was unintelligible, revealed mean discrimination scores ranging between 94.63 and 99.32 for all groups for both ears.

Hearing was further investigated by looking individually at each Group to identify subjects whose responses did not average 20 dB or below in the better ear. All children in the Unilateral Group conformed to this criterion. All were adequately tested in this group. In the Unilateral-C Group, all but one subject had hearing within this limit. She was successfully aided and had speech reception thresholds averaging 92% in the better ear.

The Palatal Groups both presented more evidence of hearing problems averaging more than 20 dB in the better ear. In the Palatal Group, this was true of seven of 39 subjects (18%). Six of these seven had discrimination scores of 96% or above in the better ear. One, who was difficult to test reliably, was also mentally retarded. However, later analysis revealed that her verbal I.Q. was higher than her performance, so the hearing was not the major factor in her developmental problems.

In the Palatal-C Group, there was, as might be expected, much greater variability in response to hearing testing. Only 31 of the 39 could be evaluated without adopting special procedures. Six of the eight gave response to some auditory stimulation at levels suggesting the probability of normal hearing. Two had losses that would place them in the category of moderate hearing loss. These two children were both profoundly retarded in all aspects of development. All eight of these children had serious developmental problems, and the test battery could not be completed on any of them. They were kept in the study, however, because dropping them would have led to an overly optimistic evaluation of the Group as a whole.

Procedure

All examinations were conducted during regularly scheduled visits to the Cleft Palate Center after informed consent had been obtained from the parents. This procedure had the advantage of requiring no extra time or expense for the families and assured that the study sample was representative of the ongoing clinical population, which is also composed of slightly more isolated than unilateral complete clefts as is true of the group reported upon here.

The test protocol included the evaluations discussed in the foregoing section; measures of self-concept, which are not included here; and assessment of intelligence and social maturity. The latter two procedures are described below.

Intelligence testing was accomplished by using the appropriate form of the Wechsler Intelligence Scales for all of those subjects who could cooperate (211 or 93%). Preschool children between four and six years of age were examined by means of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) (Wechsler, 1967). From 17 to 21% of the subjects in each Group were given the WPPSI. Subjects between six and 16 years of age, from 76 to 80% of each Group, were examined using the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974). From three to six per cent of the subjects in each Group were given the Wechsler Adult Intelligence Scale (Wechsler, 1955) because they were over the age of 16.

These instruments were selected because they yield verbal, performance, and full-scale I.Q.'s. In addition, the WISC-R correlates with the WAIS at .95 and with the WPPSI at .82. Thus, it was justifiable to combine these test results across ages and test forms, particularly since all forms of the test were represented in all four Groups.

Social maturity was assessed by means of the Vineland Social Maturity Scale (Doll, 1965). This standardized interview with parents has the advantage of permitting social data to be collected while the child is undergoing additional testing elsewhere. The Vineland provides a social quotient, which makes it possible to compare results across a variety of ages from infancy through adulthood. The disadvantage, of course, is that parents may not be reliable reporters. However, scoring the instrument from indirect rather than direct questioning, as Doll intended, largely overcomes the obstacle.

It should be noted that the number of subjects varied from one examination to another. For example, an occasional subject could not, for a variety of reasons, complete the entire test battery. The exact numbers of subjects participating in a given part of the 368 Cleft Palate Journal, October 1979, Vol. 16 No. 4

project are reported in the tables found in the results section.

Results

INFORMATION FROM WECHSLER INTELLIGENCE SCALES

Verbal I.Q.: The Unilateral Group had a mean verbal I.Q. of 105. While this was higher than the mean of 101 for the Palatal Group, the difference did not prove to be significant. The Unilateral-C Group had a mean verbal I.Q. of 95. This mean was not significantly different from either the Unilateral or the Palatal Groups and did not differ either from the mean of the Palatal-C Group. The Palatal-C-Group mean of 91 did differ significantly from both the Unilateral and the Palatal Groups. Thus we see that the Unilateral and Palatal Groups are similar in verbal I.Q. and that the Unilateral-C and Palatal-C Groups tend to resemble each other. However, the ranges are similar for all four groups. It would appear that, when other congenital anomalies are present, verbal I.Q.'s are at risk, especially in the isolated group. (See Table 3a.)

Performance I.Q.: The Unilateral Group again had a higher mean I.Q. (104) than did any of the other three groups. This difference reached significance when compared with the means for both the Palatal and Palatal-C Groups. There were no other significant differences.

The ranges for performance I.Q.'s appeared to be different from those found for verbal I.Q.'s. While this may be an artifact in these data, it is to be noted that the range for the Unilateral Group did not go down as low as did the ranges in the other groups but was similar at the high end of the distribution to both the Unilateral-C and the Palatal Groups. The Palatal-C Group was almost equal to the Unilaterals at the low end of the range but was eight points lower than any of the other groups at the high end. These data are summarized in Table 3b.

Comparison between Verbal and Performance I.Q.'s: Since the literature has frequently attested to significantly higher performance than verbal I.Q.'s in children with clefts, intra-group comparisons between the two were made. There were no significant differences for any of the groups except the Palatal Group. This group had a mean V.I.Q. of 101 as opposed to a mean P.I.Q. of 97. This difference fell just short of statistical significance (.006 level of confidence). However, the actual differences does not even approach the differences which Wechsler (1974) reports as having clinical significance. Differences vary according to age but range from a low of

TABLE 3. Comparisons Among Groups on the Wechsler Intelligence Scales (Two-tailed t tests for Unmatched Groups)

			a. Verb	al I.Q.						
			Standard Devia-	Range	Unilateral		Unilateral-C		Palatal	
	Number	Mean	tion		t	Р	t	P	t	P
Unilateral	95	104.92	17.92	51-135						
Unilateral-C	15	95.27	26.43	49-136	1.81	.07				
Palatal	72	101.28	18.93	50-136	1.27	.21	1.04	.30		
Palatal-C	29	90.55	23.40	49-137	3.51	.001*	0.61	.55	2.40	.02*
			b. Perform	nance I.Q.						
Unilateral	95	104.25	14.94	60-135						
Unilateral-C	15	95.93	20.68	46-132	1.90	.06				
Palatal	73	97.32	17.34	45-134	2.78	.01*	.027	.79		
Palatal-C	30	92.40	18.10	58-124	3.60	.001*	0.59	.56	1.29	.20
			c. Full-Sc	ale I.Q.'s						
Unilateral	95	105.05	16.73	56-135						
Unilateral-C	15	94.93	24.40	43-139	2.03	.04*				
Palatal	72	99.49	19.15	43-137	2.00	.05*	0.80	.43		
Palatal-C	29	91.00	21.38	49-134	3.70	.001*	0.55	.58	1.95	.05

One subject in this group was successfully tested on the performance but not on the verbal scale. * Statistically Significant. 10.81 to a high of 12.27 I.Q. points. In addition, this one significant difference found was that of verbal I.Q. higher than performance. These data support the conclusion of Mc-Williams and Musgrave (1972) to the effect that verbal I.Q. was as likely to be higher than performance as the other way around. However, in that study, the differences between the two, regardless of direction, were in the significant range described by Wechsler (1974).

On the basis of this study, then, it appears that we should no longer accept as fact the higher verbal than performance I.Q. At least, we should not generalize to all populations of subjects with clefts.

Full-Scale I.Q.: Subjects in the Unilateral Group had a mean full-scale I.Q. of 105 as opposed to 95 for Unilateral-C subjects. This difference was significant at the .04 level of confidence.

Those subjects in the Palatal Group had a mean full-scale I.Q. of 99. This differed at the .05 level of confidence from the means of both the Unilateral and the Palatal-C Groups. The Palatal Group did not differ significantly from the mean for the Unilateral-C Group. Thus the Palatal Group was inferior to the Unilateral Group and superior to the Palatal-C Group with a higher mean I.Q. and a lower standard deviation (although not significant) than the Unilateral-C Group.

In the Palatal-C Group, the mean full-scale I.Q. of 91 was lower than for any of the other groups. This group differed from the Unilateral Group at the .001 level of confidence and from the Palatal Group at the .05 level. There was no difference between subjects in the Unilateral-C and Palatal-C Groups.

It is interesting to note that the lowest I.Q.

in the Unilateral Group was 56, seven points higher than the lowest I.Q. for any of the other three groups. However, the highest I.Q. in the Unilateral Group (135) compared favorably with the highest I.Q.'s in the other groups. (See Table 3c.)

Comparisons of Group Means with Theoretical Normal Curve: Table 4 shows how the four groups in this study compared with the theoretical normal curve, which is closely approximated by the three forms of the Wechsler and is thus used to reflect the expected distribution of I.Q.'s in a "normal" population.

The Unilateral Group had a much higher proportion of I.Q.'s over 120 than would be expected in a normal distribution. This is also true but to a lesser extent of the Palatal Group. The Unilateral-C and the Palatal-C Groups had somewhat fewer I.Q.'s in that range than would be expected. The Unilaterals also had more I.Q.'s in the range 110-119 than would have occurred in a normal distribution, but this was also true of the Unilateral-C Group. The reduction in I.Q.'s over 120 and the increase between 110 and 119 resulted in this Group's having the expected 25% of the total sample with I.Q.'s of 110 and above. The Palatal Group, on the other hand, was close to the expected frequency of I.Q.'s 110-119, while the Palatal-C Group was grossly different from both the norms and the other Groups with only 11% of the subjects having I.Q.'s over 110.

In the I.Q. range of 90 to 109, where 50% of the population would be expected to fall, the Unilateral Group, with 41% of its subjects in this range, came closest to the expected frequency. In the other three groups, only 38% of the I.Q.'s fell between 90 and 109.

None of the groups matched the norm of

I.Q.	Normal Distri- bution (%)	Total Cleft Sample (211) (%)	Unilateral (%)	Unilateral-C (%)	Palatal (%)	Palatal-C (%)
120+	8.9	15] 20	21] 42	6] 05	13] 20	6],,
110-119	$16.1 \int 23$	$17\int_{0}^{32}$	22^{43}	19^{23}	17^{50}	5
90-109	50.0	39	41	38	38	38
80-89	16.1	9	8	13	11	5
(79	8.9	13]	7]	19]	16]	21]
Untestable-		7^{20}	o} /	6^{25}	5^{21}	26
(69-	2.2	6	4	13] 10	4]	13] 00
Untestable-				6	5	26

TABLE 4. Distribution of Full-Scale I.Q.'s Compared to Theoretical Normal Curve

16.1% for I.Q.'s from 80 to 90. The Unilateral-C Group came closest with 13%. The others were lower with the Palatal-C Group having only 5% in this range.

When I.Q.'s of 79 or below were examined, the Unilateral Group had a slightly lower percentage than would be expected, while the Palatal and Unilateral-C Groups had nearly twice as many as would be found in a normal distribution. The Palatal-C Group had well over twice as many as would be expected to occur.

These figures are, however, more optimistic than is warranted. Most of the children who experienced difficulty during the testing were known to be so seriously retarded that the instruments were not appropriate to their needs. When they were counted in the groups with I.Q.'s of 79 or lower (which appeared to be justified even though it is obvious that this is not a standard procedure), the Unilateral Groups remained in the desirable position of having a slightly lower percentage of subjects in this range than would be expected. The Palatal Group, however, had more than twice as many subjects in this classification; the Unilateral-C Group nearly three times what would normally occur; and the Palatal-C Group more than five times the normal occurrence of I.Q.'s of 79 or below.

Perusal of data on subjects with I.Q.'s 69 and below sheds additional light on this picture. The Unilateral Group had a somewhat higher percentage in this classification than would be expected as had the Palatal Group both excluding and including those who could not be tested. The Unilateral-C Group had a proportion of subjects, including those who could not be tested, falling below 69, nearly nine times greater than the expected proportion, while the occurrence of I.Q. below 69, including those who could not be tested, was more than 13 times greater in the Palatal-C Group than in a normal distribution.

Once again, the order holds. The Unilateral Group performed better than any of the other groups and, in fact, had more capable subjects than would normally be expected—although it would be imprudent to conclude that this is necessarily characteristic of individuals with unilateral clefts of the lip and palate. The Palatal Group retains its rank order of two; and the Unilateral-C Group remains in third place. The Palatal-C Group, in fourth place, trails seriously behind all the other groups, with 52% of the total group having I.Q.'s below 90 and 39% below 70.

Effects of Socioeconomic Status: It will be remembered (Table 1) that more subjects in the Unilateral Groups were in the "private-patient" category than was true for the subjects with isolated clefts. Table 4 summarizes data derived from an examination of the subjects who were successfully tested on one of the Wechsler forms and who were classified as "State" or "Private." In the Unilateral and Palatal Groups, those in the private classification invariably tested higher than the group mean. The 17 such subjects in the Unilateral Group (18% of the 95 tested) had a mean I.Q. of 114 as opposed to 105 for the entire Group. In the Palatal Group, eight of 72 (11%) were private patients, and their mean I.Q. was 117 in contrast to 101 for the entire Group. Interestingly enough, the private classification appeared to have no effect when other congenital abnormalities were present. There were only two private patients (13%) in the Unilateral-C Group. Both were retarded, one profoundly. In the Palatal-C Group, the four children in the Private category represented 14% of the 29 completely tested, and their mean I.Q. was 90 as opposed to 91 for the entire Group. These numbers are quite small, and the order alluded to earlier does not hold-except that those children without other congenital abnormalities were superior to those who had such added complications.

In a similar manner, the subjects under the State programs were also investigated. The Unilateral Group in this classification had a mean full-scale I.Q. of 103 as opposed to 105 for the entire Group, while the Palatal Group had a mean of 97 as opposed to 99 for their entire Group, both just two I.Q. points lower. The Unilateral-C Group had a mean I.O. of 97, two points higher than the Group mean, while the mean of 92 for the portion of the Isolated-C Group on State programs was one point higher than the Group mean. Once again, the Unilateral Group was superior, with the Unilateral-C and the Palatal Groups being similar, and the Palatal-C Group manifesting the greatest difficulty.

The reasons for the higher I.Q.'s in the private Groups without other anomalies should be interpreted cautiously because the numbers are small. However, the findings suggest that parental training and early childhood stimulation might help to minimize inadequacies at a later age. Further study is needed to explain why these findings did not hold for subjects with other abnormalities. It may be that stimulation after a certain point is not helpful or that parents, when faced with multiple problems in children, respond to them differently regardless of background.

INFORMATION FROM VINELAND SOCIAL MATURITY SCALE

The Vineland Social Maturity Scale revealed mean social quotients within normal limits for the Unilateral Group (mean S.Q. 107) and for the Palatal Group (mean S.Q. 102). However, these mean social quotients differed significantly from each other at the .05 level of confidence. Since both of these means were well within normal limits, it is difficult to interpret beyond observing that the Unilateral Group was somewhat superior to the Palatal Group.

The Unilateral Group also had a significantly higher mean social quotient than the Unilateral-C Group, whose mean was 97, and than the Palatal-C mean of 84. The Palatal Group was superior to the Palatal-C Group as well. (See Table 5). Again, the ordering from high to low remains the same—Unilateral, Palatal, Unilateral-C, Palatal-C.

Discussion

This study suggests that subjects with unilateral complete clefts of the lip and palate develop both mentally and socially with fewer evidences of difficulties than do children in the other classifications studied. In fact, those subjects with unilateral complete clefts of the lip and palate appeared to function generally within normal limits. There seems little reason to be concerned about the occurrence of more than the expected number of developmental disabilities. Parents should, perhaps, be counseled to this effect in order that they may be as anxiety-free as possible as they begin to cope with the problems of the cleft and, at the same time, help their children grow up with as positive a self-image as possible.

Subjects with palatal clefts only did less well than their Unilateral peers. Of major concern is the finding that 21% had I.Q.'s of 79 or below, while 9% were at 69 or below. Thus, the developmental difficulties experienced by this Group were more likely to be in the moderate rather than in the severe range. In spite of this, there is obviously an increased risk in this Group, and the children should be carefully monitored developmentally so that appropriate counseling and intervention can be instituted as early as the need is recognized.

The Unilateral-C Group was, overall, marked by the relatively normal occurrence of capable subjects and an increase in the proportion of subjects suffering from retardation, placing them at greater disadvantage developmentally than either the Unilateral or the Palatal Groups.

The Palatal-C Group also had some very able subjects, but they were more likely to show evidences of retardation than any of the other groups. This possibility is so strong that there is no doubt at all but that this is an extremely high-risk population of children.

It appears from this study that the presence of associated malformations in children with clefts indicates the necessity for developmental surveillance as a routine part of clinical care. Parents of such children undoubtedly require ongoing counseling as well so that their own anxieties may be minimized and their children's potential maximized. While

TABLE 5. Comparisons Among Groups on the Vineland Social Maturity Scale (Two-tailed t tests for Unmatched Groups)

	Number	Social Quotients			Unilateral		Unilateral-C		Palatal	
		Mean	Standard Devia- tion	Range	t	Р	t	Р	t	Р
	(226)									
Unilateral	95	107.33	14.41	52 - 148						
Unilateral-C	16	96.69	20.16	65-150	2.57	.012*				
Palatal	76	102.09	19.86	41-140	2.00	.048*	0.99	.326		
Palatal-C	39	84.49	30.73	2 - 141	5.86	.000*	1.46	.150	3.71	.000*

* Statistically Significant.

this is especially true if the cleft is of the palate only, those with unilateral complete clefts of the lip and palate are also at increased risk when other malformations are present.

It must be emphasized that the presence of a particular cleft type was not an accurate predictor of either mental or social development in individual subjects. Even in the presence of multiple other congenital abnormalities, children with clefts of the palate only were sometimes gifted, while those with uncomplicated unilateral complete clefts of the lip and palate were sometimes retarded. However, the chances of these combinations occurring were very small. It is apparent that infants with clefts, especially if they are clefts of the palate only, are at extremely high risk for subsequent developmental deviations. sometimes in the profound range. For this reason, they should be routinely assessed from the beginning in order that intervention and parent guidance may be a part of the total treatment plan. This may emerge as a special need for children who are not classified as private patients, whose parents are less likely to be able to afford nursery schools and, perhaps, to have leisure to spend in stimulating interaction with their children. On the other hand, we can be somewhat more optimistic about the outcome for children who do not have other anomalies and can assist them in maximizing their potential capacities.

Another important finding was that, in none of the groups, was performance I.Q. superior to verbal I.Q. Since the literature has frequently reported such a discrepancy, this further study is obviously needed. We suspect that the answer will lie ultimately in speech adequacy since speech was not described in those studies that reported such differences.

When data from all aspects of this study are synthesized, it appears safe to conclude that, developmentally, subjects in the Unilateral Group had the fewest problems, followed by the Palatal Group, then by the Unilateral-C Group, and, finally, the Palatal-C Group. This latter group had more problems in all areas and had a better than 50-50 chance of experiencing developmental delay of some significance.

The need for very careful and accurate diagnosis at birth cannot be overemphasized. Unfortunately, many cleft palate teams do not have routine pediatric and genetic services available. This study points up the essential nature of the pediatrician's and the geneticist's roles in diagnosis and treatment. It also presents evidence to support the need for careful developmental assessment and parent counseling as routine parts of cleft-palate management, especially when other anomalies are present.

A further outcome of this study is the recognition once again of the need to view cleft lip and palate as part of a wide assortment of different entities that should never be grouped together and discussed as a single problem.

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