

Oral Form Discrimination in Individuals with Normal and Cleft Palates

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The extent of orosensory impairment associated with oral-facial clefts is not yet clear. Perhaps even less clear is the relationship between articulation errors and orosensory discrimination in persons with clefts. Mason's (3) preliminary findings indicate that there are no differences in oral stereognostic ability between persons having different types of clefts. Although scores attained by these subjects were not compared with those of non cleft persons, the conclusion might be drawn that no sensory deficit was present. Further, according to Bosma (1), congenital anomalies such as oral-facial clefts do not typically result in serious impairments of oral tactual sensation. On the other hand, when the oral stereognostic performance of twelve cleft palate adults was compared with that of thirty normal adults, the latter demonstrated superior ability (2).

The purpose of the present investigation is to compare the performance of a group of persons having cleft palates with a group of non cleft persons on a test of oral form discrimination and, for the cleft palate group, to relate these results to type of cleft and adequacy of articulation.

Procedure

SUBJECTS. Subjects for the investigation were thirty-nine cleft palate persons ranging in age from six years, six months to twenty-nine years, four months. The mean age was twelve years, five months and the median age was eleven years, four months. These persons were seen by the investigator over a period of four months in a cleft palate clinic and were consecutive patients with several exceptions. Clients under six years, six months of age were not tested nor were persons with cleft lips only, submucous clefts, or velopharyngeal insufficiency in the absence of a cleft palate. Six persons eligible to be tested were not, because of time limitations. Twenty of the subjects tested had left unilateral clefts of the lip and palate, eleven had clefts of the palate only, seven had bilateral cleft lips and palates, and one had a right unilateral cleft lip and palate. All clefts had been surgically closed with the exception of one subject who

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Data on cleft palate subjects used in this investigation were collected while the author was Coordinator, Cleft Palate Conference, University of Oklahoma Medical Center.

had an unrepaired isolated cleft of the palate and one subject with a repaired left unilateral cleft lip and anterior palate but an unrepaired posterior palate.

Each cleft palate subject was matched by age, plus or minus three months, with a non cleft subject in order to control for differences in oral form discrimination ability due to age. These persons were judged to have normal speech as well as normal orofacial structures.

ORAL FORM DISCRIMINATION TEST. A fifty-five item test of oral form discrimination was administered to all seventy-eight subjects. The stereognostic forms utilized are pictured in Figure 1.

Each form was paired with every other form and with itself. Pairs of forms were presented in a different random order to each subject. In addition, the first item within each pair to be presented was randomly selected. The subjects were given five seconds to explore and manipulate each object orally. Forms were placed behind the subjects' teeth and subjects were instructed to close their lips around the thin handle of each piece. Encouragement was given to inspect the forms carefully. All subjects were blindfolded during the test to rule out the possibility of their making visual discriminations. After exploring the first item of a pair for five seconds it was removed and the second form was immediately placed within the subject's mouth. When the second form had been in place for five seconds it was removed and the subject told the examiner whether the two objects were the same or different.

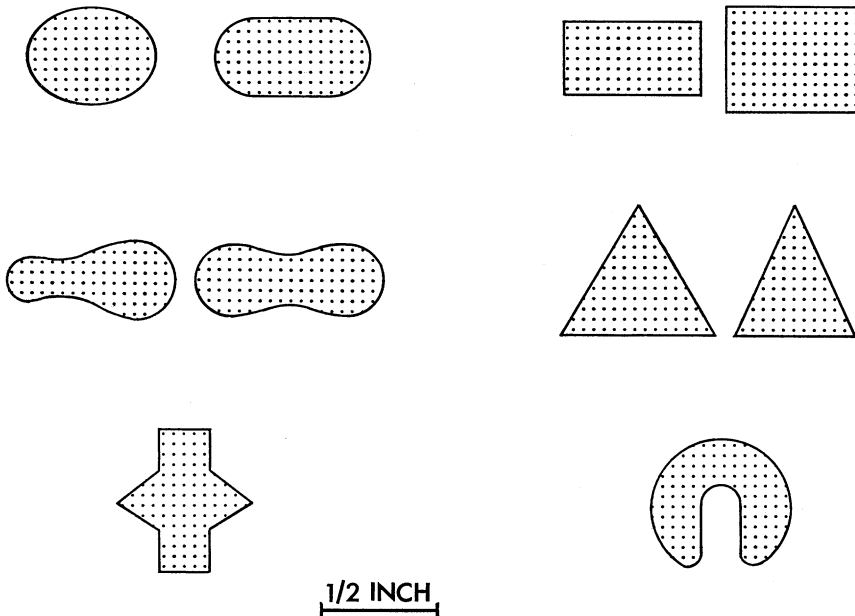


FIGURE 1. Shapes of plastic forms presented intraorally to subjects. All forms approximately one-eighth inch thick.

In order to provide a measure of reliability, ten of the fifty-five pair were randomly selected for each subject and presented again at the end of the test. In all, sixty-five pair of forms were presented.

ARTICULATION TEST. A sixty-four item single word articulation test was administered by the same clinician to thirty-four of the thirty-nine subjects in the experimental group. This test assessed the subjects' production of twenty-three consonant sounds in the initial, medial, and final positions of words. The sixty-four words were spontaneously elicited by pictures or a printed list, depending upon the age of the subject.

Results

RELIABILITY OF ORAL FORM DISCRIMINATION TEST. The mean number of identical responses for the ten test-retest items was 8.1 for the cleft palate group and 8.6 for the non cleft group. Seventy-nine percent of the non cleft matched control subjects made the same decision on eight or more of the ten items. Sixty-seven percent of the cleft palate subjects made identical judgments on eight of the ten repeated items. This discrepancy between groups may be due to the poorer orosensory ability of the cleft palate subjects relative to the non cleft subjects as reported below. Consistency might be expected to approach chance level in persons with severely reduced tactile sensation.

CLEFT PALATE SUBJECTS VERSUS NON-CLEFT SUBJECTS. As shown in Table 1, the range of errors on the fifty-five item oral form discrimination test was from one to thirty-five for the cleft palate group and from one to twenty-three for the non cleft group. The mean number of errors was 10.5 and 7.3 for the cleft palate and non cleft group, respectively. The results of a *t* test comparing these means revealed that the difference is statistically significant ($t = 2.43$, $P = < .025$). That is, subjects with cleft palates, as a group, performed more poorly than subjects without clefts.

As discussed by Ringel *et al.* (5), subjects performing the type of task presented in this investigation must make comparison judgments about the shapes of the forms and about the relative sizes of the forms. When two forms are similar in shape but different in size, it has been said that the subject is making a within-class comparison (4, 5). On the other hand, when two forms are different in shape the judgment has been called a between-class comparison (4, 5).

TABLE 1. Range and mean number of errors on an oral form discrimination test administered to 39 cleft palate and 39 non cleft subjects.

<i>group</i>	<i>range of errors</i>	<i>mean number of errors</i>	<i>t</i>
cleft palate (N = 39).....	1-35	10.5	2.83*
non cleft (N = 39).....	1-23	7.3	

* Significant at the .025 level.

In order to determine which type of judgments best discriminated between the cleft palate and non cleft groups, chi square analyses were performed for both within-class and between-class judgments. On fourteen of the fifty-five test items, the pair presented was similar in shape and the subject was required to make a judgment about size. The statistical analysis revealed that this within-class comparison did not differentiate between the two groups of subjects ($\chi^2 = 1.71$, $P = >.05$). Forty-one of the test items required between-class comparisons (i.e., the shapes of the two forms presented were dissimilar). This type of task, as determined by the chi square statistic, did effectively discriminate between the two groups ($\chi^2 = 89$, $P = <.01$). Thus, while cleft palate subjects and their matched controls did not perform significantly different when making within-class comparisons, the cleft palate subjects were poorer than non cleft subjects in making between-class judgments.

TYPE OF CLEFT. As shown in Table 2, the mean number of errors on the oral form discrimination test was strikingly similar between the subgroups containing more than one subject. Mean number of errors for subjects having left unilateral, isolated palatal, and bilateral clefts was 10.6, 10.5, and 9.3 respectively.

ADEQUACY OF ARTICULATION. The results of an articulation test were available for thirty-four of the cleft palate subjects. In order to avoid articulation errors of a developmental nature, subjects under eight years of age were eliminated from this aspect of the investigation. The cut-off point of eight years was used since most developmental norms indicate that by this age normal articulation can be expected. Seven of the subjects were under age eight. A total of twenty-seven cleft palate subjects remained.

The number of articulation errors for these twenty-seven subjects ranged from zero to forty-two. The median number of errors was sixteen. Subjects with zero to sixteen errors were placed in group one ($N = 14$) and subjects with seventeen to forty-two articulation errors were placed in group two ($N = 13$).

As shown in Table 3, the mean number of errors on the oral form discrimination test for group one (lower half) was 7.1 while the same statistic for group two (upper half) was 14.6. The results of a t test

TABLE 2. Mean number of errors on an oral form discrimination test by subjects representing four types of clefts

	<i>type of cleft</i>			
	<i>left unilateral</i> ($N = 20$)	<i>right unilateral</i> ($N = 1$)	<i>bilateral</i> ($N = 7$)	<i>palate only</i> ($N = 11$)
mean number of errors...	10.6	16	9.3	10.3

TABLE 3. Mean age and mean number of errors on an oral form discrimination test for two groups of cleft palate subjects differing in articulation proficiency.

	<i>mean age in months</i>	<i>mean number of errors</i>	<i>t</i>
lower half (subjects making 0-16 articulation errors (N = 14))	147	7.1	2.83*
upper half (subjects making 17-42 articulation errors (N = 13))	160	14.6	

* Significant at the .01 level.

comparing these two means revealed that they are significantly different ($t = 2.83$, $P = < .01$). That is, the group making the fewer number of articulation errors performed better on the oral form discrimination test than the group with the greater number of articulation errors. The mean age of subjects in group one (0-16 articulation errors) was twelve years, three months compared to a mean of thirteen years, four months for group two (17-42 articulation errors).

Discussion

The results of this investigation indicate that orosensory functioning in cleft palate persons, as determined by a test of oral form discrimination, is inferior to that of non cleft persons. In this respect the data confirm the results of Hochberg and Kabcenell (2). Scrutiny of the data in relation to articulatory proficiency, however, make this generalization only partly true. When the cleft palate group was divided into two halves on the basis of number of articulation errors, the number of errors on the oral form discrimination test for the half with the best articulation was essentially the same as that of the non cleft subjects. On the other hand, as shown in Table 3, those cleft palate subjects with poorest articulation performed more poorly on the oral form discrimination test than did either the non cleft subjects or the cleft palate subjects with relatively good articulation. Although it is well known that oral stereognostic performance improves with age, the mean age of the cleft palate group performing most poorly was greater than that of the cleft palate group which performed relatively well on both the articulation test and the test of oral form discrimination. Furthermore, oral stereognostic ability appears not to be dependent upon the type of cleft. In this respect the present investigation confirms the findings of Mason (3), as described earlier.

One interpretation of the data might be that reduced orosensory skill sometimes occurs in conjunction with a cleft palate and that this depressed sensory ability manifests itself in relatively poor articulation. In addition, persons with cleft palates are more likely to have a reduction in oral discrimination ability than are non cleft persons. On the other hand it might be argued that since reduced orosensory ability and articulation

errors tend to be associated with one another (4, 5, 6), the cleft palate speakers appeared to be inferior to the non cleft speakers only because the former group contained persons with relatively poor articulation.

More appropriately, the data indicate that as a group, cleft palate persons with relatively poor articulation perform more poorly on an oral form discrimination task than non cleft persons and that a group of individuals with cleft palates and relatively few articulation errors cannot be differentiated from a group of non cleft persons on the same task. These findings cannot be accounted for by age of the subjects or type of cleft. Between-class judgments, in which subjects made a decision about the similarity of two forms differing in shape, best discriminated between cleft palate and non cleft subjects. The results of this investigation support the notion that a test of orosensory discrimination can differentiate between a moderately to severely impaired articulation group and a group of persons with mild to moderately impaired articulation. On the other hand, the oral form discrimination test did not differentiate between normal speakers and cleft palate persons with a mild to moderate articulation impairment.

Summary

Thirty-nine cleft palate persons were each matched by age, within three months, with a non cleft person having no known defect of speech or oral-facial structure. A fifty-five item oral form discrimination test was administered to both groups of subjects. Non cleft persons performed significantly better than did the cleft palate persons. Those items on the oral form discrimination test which called for subjects to make a distinction between two shapes best differentiated between the two groups. Number of errors on the orosensory test were similar for persons with bilateral, left unilateral, and isolated palatal clefts. When the cleft palate group was divided in half on the basis of number of articulation errors, the mean performance of the better group (the half with fewer errors) on the oral form discrimination test was essentially the same as that of the non cleft subjects. The mean number of errors on the oral form discrimination test for the poorer articulation group was significantly greater than for either the non cleft group or the cleft palate group with relatively good articulation.

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