A Videoradiographic Investigation of the Position of the Tongue Prior to Palatal Repair in Babies with Cleft Lip and Palate

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Lateral videoradiography was carried out on nine babies, seven with clefts and two without, at rest and while feeding with a barium mixture. No discernible difference was found in tongue movement or position between the cleft and noncleft babies, nor did the presence or absence of a presurgical plate make any difference.

The traditional timing of palatal repair has been between the ages of 12 and 18 months. This timing is based on the belief that palatal repair should be left as late as possible to facilitate maxillary growth, but should not be so delayed as to retard the development of speech.

Over the last 15 years it has been suggested by various surgeons that the palate should be closed earlier, in some cases at the same time as or prior to lip repair (Malek and Psame, 1983: Kaplan et al, 1974). The rationale for closing the palate early is: (1) to correct the anatomical deformities due to the tongue’s abnormal position and (2) to allow for normal development of breathing, swallowing, hearing, and speech.

The basis for the early closure of the palate is stated by Malek and Psame (1983) as follows:

"The tongue is in an abnormal situation in cleft lip and palate infants. It falls backwards because of the separation of the pterygoid processes. During swallowing, the tongue penetrates the nasopharynx."

This alleged abnormal position of the tongue had been determined by videoradiography. It was decided to attempt to duplicate the investigation of Malek and Psame regarding the position of the tongue in the infant with cleft lip and palate, during rest and feeding.

METHOD

Nine patients were selected for investigation. Seven babies had clefts of the lip and palate, but had no other known abnormalities and were believed to have normal neuromuscular function.

Two noncleft babies undergoing barium swallow radiographic investigation for bowel problems were used as controls.

The sample, divided into four groups (Table 1), was made up of babies available in the hospital at the time of investigation whose parents consented to the examination: Group 1 was composed of two babies with no facial clefts. Group 2 included two babies, one with a bilateral cleft lip and palate and one with a unilateral cleft lip and palate who had not had presurgical orthopaedic treatment or lip repair. Group 3 was one baby with a unilateral cleft lip and palate who was under presurgical orthopaedic treatment but had not had a lip repair. Group 4 included one baby with a bilateral cleft and three babies with unilateral cleft lip and palate who had undergone presurgical orthopaedic treatment and a lip and alveolar repair ("Muir flap").

All babies with presurgical orthopaedic plates were still wearing them, and in the investigation video studies were taken with and without the plates in situ.

IMAGING EQUIPMENT

The machine used was a Pediatrix C.G.R., which is a dedicated pediatric fluoroscopic unit. The screening factor was 0.2 mVa at 80 kVp, with a Hafnium filter permanently in position. The radiation dosage was 150 mA per minute. The total time per baby was 1 minute.

RADIOGRAPHIC TECHNIQUE

The babies were positioned as for a standard barium swallow (i.e., strapped supine and horizontal to a pediatric table with the head turned to the right). Screening was performed

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in a standard fashion, but with a videotape continuously recording the image intensifier image. The following views were taken of each baby in as identical a manner as possible (times denote actual radiation exposure):

1. One times 15 seconds of feeding with barium mixture
2. Three times 10 seconds with baby "at rest"—the episodes were at 1 minute intervals
3. One times 15 seconds of the baby crying

The radiation exposure was considerably less than for an average barium swallow for reflux.

**RESULTS**

On examination of the videoradiographic record by the authors, we could discern no difference in the position of the tongue between group 1 and groups 2, 3, and 4 in either rest or function (Figs. 1 and 2). Nor was there any detectable difference among the positions of the tongue in groups 2, 3, and 4. Furthermore, the position did not differ in groups 3 and 4 whether the plate was worn or not.

The video recording of all groups was also viewed on a "blind basis" by an independent panel of three speech pathologists. They were also unable to detect significant differences among the four groups.

In particular, there was no evidence of the tongue falling back into the pharynx or of "tongue humping," which possibly develops later as the infant starts to manipulate the soft palate with the posterior region of the tongue.

The video film record did not permit individual frames to be isolated and traced. Examination was by observation and drawing significant frames on a comparison basis.

No gross macroscopic evidence of an abnormal position of the tongue was detected in cleft lip and palate babies.
DISCUSSION

Consideration must be given to the limitations of the technique we have chosen for the assessment of the position of the tongue. The lateral view provides considerable information about the position of the tongue. However, it cannot be used to determine other possible contributing factors (e.g., intrinsic lingual muscle tension) or the amount of pressure exerted by the tongue on the palate. Nevertheless, at present, it was felt that lateral videoradiography offered the most practical assessment technique, since it is noninvasive and does not interfere with oral function.

The result of this investigation was a little surprising. We had expected to see little difference between group 1 and groups 3 and 4. The work of Stuffins, 1981 had confirmed the authors' belief that if a plate is fitted soon after birth, it reduces the available area of the oral cavity to average dimensions and "normalizes" the position of the tongue. However, although we looked for some difference between the group 2 babies and the other three groups, none was observed.

Upon reflection, it is apparent that the width of the tongue is considerably greater than the width of most clefts of the palate. Furthermore, in sucking a baby tends to hollow the midline area of the tongue and press the lateral edges against the palatal shelves.

"Fallback" of the tongue into the pharynx is only seen in the Pierre Robin anomaly where it is related to the micrognathia rather than to the cleft of the palate.

REFERENCES

