

44. *Timing Palate Surgery*

THE optimum timing of palate surgery has been, and still is, a much debated subject. Before the advent of anesthesia, palate closure was postponed until adulthood. Today, with endotracheal anesthesia, palate closure is possible at any age. It is logical that the sooner the palate cleft is closed the easier it will be for the patient to develop normal speech patterns, avoiding bad habits gained during compensation for an inadequate velopharyngeal sphincter. Thus the most popular time for closure of a palate cleft has been set at about 18 months of age, or the time when speech begins to develop.

All reports on the effect of the age at the time of palate closure indicate that the earlier the operation, the more normal the speech. Holdsworth reported that his youngest group, 6 to 9 months, had 77 percent apparently normal speech as opposed to the next age, 10 to 12 months, with 54 percent normal speech. Peet's earliest group, 12 to 15 months and 170 V-Y "pushbacks," showed 82 percent without nasal escape as compared to the next age, 16 to 30 months, with 77 percent. Axhausen found that patients with palates closed at 3 years had 80 percent normal speech, while those with palates closed at 4 to 6 years had only 71 percent. Lindsay found 70 percent acceptable speech when the palate was closed before 3 years and only 60 percent after 3 years. Jolleys also found that the cutoff time for good speech was before 3 years. Calnan reported normal speech in 75 percent when operation took place between 1 and 2 years of age but only 40 percent at 4 years.

In 1964 Michael Lewin of New York published the answers to a questionnaire sent to all American and Canadian plastic sur-

geons in 1962. Of the 284 surgeons responding, 80.6 percent close the palate cleft between 1 and 2 years of age, with 18 months being the age of choice; 11.9 percent delay operation until the patient is between 2 and 4 years old. Only 15 surgeons operate on the palate before 12 months of age.

In 1972 S. O’Riain and B. N. Hammond of Odstock Hospital, England, noted that the majority of British surgeons, Battle (1954) and Braithwaite (1966) included, advocate operation at 1 year old or before the age of 18 months.

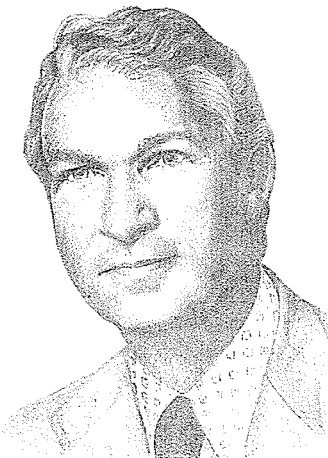
In 1976 Innes stated:

I believe, with Kilner, that the ideal time for the primary repair of all types of cleft palate is as early as possible. . . . In almost all cases conditions are right for successful surgery at the age of one year.

EARLY FOR SPEECH

Most speech pathologists favor early cleft palate closure because they are convinced that the speech results will be better with less effort. By 1964 Madame Borel-Maisonny had been P. Petit’s speech analyst long enough to follow 100 cleft cases and report the percentage of patients who recovered “normal” function of the soft palate during phonation—60 cases of 100 = 60 percent. Then she presented her statistics to probe the necessity of performing cleft palate operation before the age of 2 with the purpose of obtaining normal speech. In her study, she found that speech was normal in 63 patients, or 66 percent, operated on before 2 years of age but in only 37, or 33.4 percent, operated on after age 2.

Richard Cole, once speech therapist of the Lancaster Cleft Palate Clinic and chairman of the 1969 Symposium on the Early Treatment of Cleft Lip and Palate, and now at the University of Detroit Dental School, was quite definite about his feelings in reference to early palate closure and speech:



Richard Cole

The fact that seems rather clear is that articulatory proficiency is related to the age at which palatal adequacy is established, but that there is a very definitely greater likelihood of encountering what we refer to as “cleft palate

speech” including glottal stops, pharyngeal fricatives, the later palatal adequacy is established. Integrity need not necessarily be by surgery as prosthetic separation may serve the purpose.

I think that most speech therapists would agree that glottal stops and pharyngeal fricatives are the most difficult sound substitutions to alter in the speech of cleft palate persons, and we know that the older the patient when he begins speech therapy, the less chance we have of completely eliminating this habit.

In 1974 D. Evans and C. Renfrew of Churchill Hospital, Oxford University, made a speech assessment of 229 cleft palate patients treated by Eric Peet using a Wardill-Kilner V-Y palatoplasty. It is interesting that their study showed a slight advantage conferred by operation within the first eight months of life, and strong theoretical arguments concerning early speech development and the effect of maternal separation after this age were presented in support of early operation.

Muriel Morley of Newcastle, speech pathologist for Wardill and later Braithwaite, recalled in 1977:

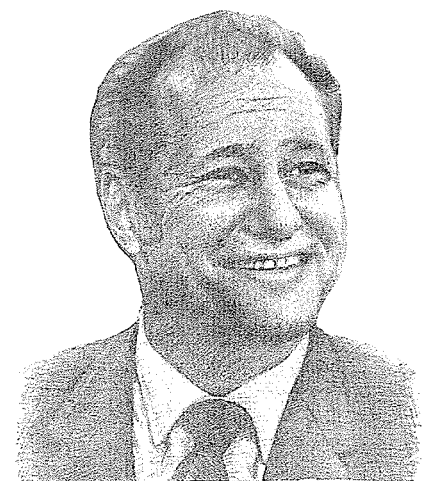
Regular observation of the developing speech from preoperative times until normal speech was established indicated that the majority of these children, submitted to surgery before three years of age, eventually developed normal speech without any specialised assistance.

Hughlett Morris of the University of Iowa stated in 1977:

We're caught between the fear, set off by Graber in the 1950s, that early surgery leads to midfacial growth deformities and the suspicion labeled by Morley, also in the 1950s, that late surgery leads to a higher incidence of velopharyngeal dysfunction and patterns of misarticulation than otherwise expected. There are more data to support the former theory than the latter though in neither case is the picture entirely clear. Naturally, as a speech pathologist, I urge that early palatal surgery be seriously considered.

Kenneth R. Bzoch of the University of Florida, of Czechoslovakian descent and a co-editor of the extensive 1971 *Cleft Lip and Palate*, wrote in 1977:

I noticed most authority figures in Speech Pathology were either stutterers or had aphasia or some other claim to the Communicative Disorders field and all I had was a cleft palate in utero (before fusion) so perhaps that's why I focused on this field.



Kenneth Bzoch

After over a quarter of a century of experience the state-of-the-art in cleft palate research has progressed to the point where a challenging clinical team goal can be set. *The goal of achieving speech, language and hearing function indistinguishable from that of their peers by three years of age* for cleft palate infants has three critical steps too often missing in treatment programs today. In order of priority these appear to be: (1) early complete reconstructive surgery of both the hard and soft palate clefts between 12 and 18 months of age, (2) establishment of a regular early effective home speech and language stimulation program in years 1 and 2, and (3) early critical evaluation of the efficacy of primary surgical closure followed directly by secondary reconstructive surgery before 3 years of age when velopharyngeal insufficiency is indicated by clinical and diagnostic therapy techniques.

On the Efficacy of Early Complete Palate Closure. My experience clearly indicates the achievement of early functional palatal reconstruction does make a marked difference in the life of children with congenital cleft palates. Research to date is inconclusive mainly because the timing of primary closure rather than the date of achievement of velopharyngeal sufficiency to support speech has been used in the past studies addressing this question. Empirically it appears that the abnormal speech stigmata requiring later prolonged speech therapy are usually avoided when functional palatal reconstruction is accomplished before 18 months of age. When closure is routinely postponed for any reason or when primary closure is not successful in achieving velopharyngeal adequacy, compensatory articulation, breathing, and phonation habits almost regularly emerge between two and four years of age. This is because the pneumatic requirements of speech physiology do require a complete and rapid coupling and uncoupling of the velopharyngeal mechanism. The use of expressive oral language for obtaining wants and needs is regularly evidenced in all infants from years one to three. The adequacy or inadequacy of primary closure can be determined from clinical tests during diagnostic therapy for any child between one and three.

LATER FOR MAXILLARY GROWTH

In 1954 bone growth expert Wilton Krogman, while at the University of Pennsylvania, noted:

The palate grows relatively little after the age of about six years . . . [thus], an optimum time for surgical procedure which would be, both in theory and in practice, in accordance with growth dimension and growth potential, is somewhere between four and six years, with the earlier age acceptable in the great majority of cases. However, if the growth tempo in the individual child be such that there is evidence of advanced growth . . . it is possible that an earlier chronological age (as early as 2 to 3 years) may be permissible.

WAIT FOR INTERLOCKING OF DECIDUOUS MOLARS

Bill Grabb called my attention to the 1968 Mosher Award winning work of Leslie Bernstein on the effect of timing of cleft palate operations on subsequent growth of the maxilla, published in *Laryngoscope*. I wrote Bernstein at the University of California, Sacramento, for recent information and was rewarded with a reprint and his permission to use any part for publication. The accompanying letter ended with

I am sure that your comments will be as fair and gracious as before.

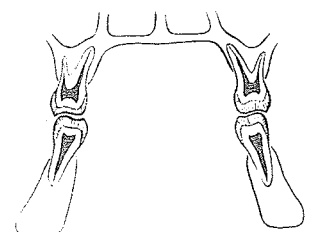
Only those familiar with Chapter 33- $\frac{1}{3}$ in Volume I will appreciate the scalpel edge of this line, and I would take my hat off to him for it, if I had one.

Bernstein, with both dental and medical degrees, while in the Otolaryngology Department of the University of Iowa, made a study of 325 subjects with surgically corrected maxillofacial clefts and 49 without surgery of the palate defect. A von Langenbeck soft tissue closure had been done in 278 while 32 had a vomer flap several months prior to soft tissue closure. In 222 subjects the preoperative occlusion of the posterior teeth had been recorded in dental casts. All retained the preoperative occlusal relationships of the posterior teeth when examined postoperatively. Under the premise that "surgical assault on the palate interferes with its lateral growth," he emphasized

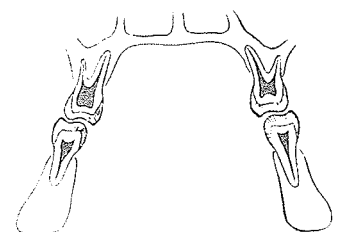
the need to delay surgery on the cleft palate until the deciduous molars are in occlusion. It also serves as a very favorable argument in support of instituting pre-operative orthodontic expansion of the palate in those patients who have already developed a cross-bite malocclusion, because after surgery the cross-bite usually becomes worse.

The main thrust of his paper was shown with two diagrams of the coronal section through the palate and mandible to show cusp relationships in the normal and in bilateral crossbite. Bernstein stated:

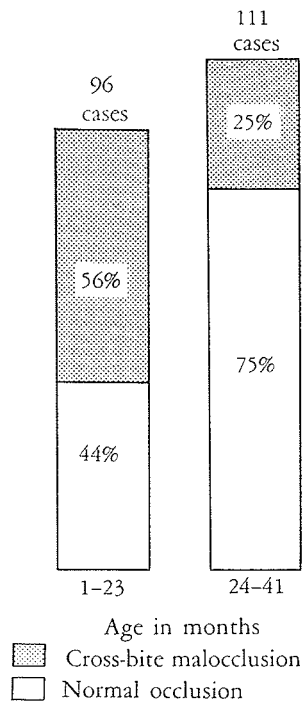
The mandibular buccal cusps, articulating on the inside of the maxillary buccal cusps, exert a wedging effect which prevents medial contraction after cleft palate repair. This effect is cancelled out in cross-bite cases.



Normal



Crossbite



He concluded:

The results of this study indicate that growth and development of the maxilla, and the appearance of the mid-third of the face, are materially altered if the palatal operation is performed before all of the deciduous molars are in proper occlusion—namely, before the age of 24–30 months. . . . It is concluded that the optimal time for cleft palate repair is between 30 and 36 months of age.

In 1977, in Toronto, N. Robertson and A. Jolleys of the Welsh National School of Medicine, Cardiff, presented a seven-year follow-up on 40 newborn infants with unilateral complete clefts of the lip and palate. They had been divided into two groups handled skillfully and identically, except in group 1 the hard palate was closed at 12 months while in group 2 the hard palate was closed at 4½ years. Serial records had been kept from birth onward, and no real differences in maxillary growth had been noted at 3 and 5 years of age. At 7 years there was still no marked difference, but the delayed group showed slightly better maxillary development, especially in the upper arch by cephalometric measurements, slight disadvantage in speech and no difference in ear problems. Robertson and Jolleys concluded that the type and degree of the original cleft condition was more important!

The orthodontists facing dental and maxillary deformities following early traumatic surgery have been effective in pointing out the direct relationship between the time and type of surgery and the severity of the deformities. They have promoted both reduction of traumatic surgery and delay of surgery. At present there is some concern about the effect of elevation of mucoperiosteal flaps and maxillary growth retardation. Early premaxillary setbacks have been discouraged. Yet both of these surgical procedures, at the right time, are acceptable. As most maxillary growth has been completed by 3 to 5 years, this is the optimum time if extensive elevation of mucoperiosteum is required.

Some surgeons, sympathizing with the ideal early palate closure for the best speech results, follow early surgery with expansion plates and other devices to maintain arch alignment against the postoperative scar contracture. This is not a luxury I enjoy.

TIMING AND TYPE OF SURGERY

In 1973 Wolfgang Koberg of Düsseldorf reported on electronically analyzed data on 1,033 cleft patients in Rehrmann's clinic. For the previous five years, speech had been evaluated by a speech therapist and maxillary growth investigated by the "Dysgnathia Index." Koberg summarized:

A direct linear relationship is existent between the age of operation and speech result. . . . The measure of iatrogenic disturbance in maxillary growth depends on the technique applied in palatoplasty. . . . Without any vital damage to maxillary growth, a relatively early but "atraumatic" palatoplasty at the age of 2-3 years can be achieved.

He concluded with suggestions for type and timing of surgery:

1. The isolated median incomplete or complete cleft palate should be closed in one sitting after the second year of life, using the pediculated [Veau] flap technique. Prognosis for normal colloquial language rates 65-70%.

2. The uni- or bilateral total cleft palate cases, we . . . advocate closure in 2 sittings: at the age of 6 months, primary closure of anterior part of cleft palate according to *Pichler*, with simultaneous closure of cleft lip and alveolus. And at the age of 2 years, the plastic closure of residual cleft using the stalked or pediculated flap technique [Veau]. Where a primary *Pichler*-plasty is not usable, *Andrä* (1966) still thinks that *Schweckendiek's* procedure should be attempted at the age of 12 months. The prognosis for acquiring a flawless colloquial language verges on 70% for unilateral complete clefts, and about 65% for bilateral cases.

3. Isolated clefts of the velum should be operated at two years of age, using the pedicle flap technique. To elongate the nasal mucosa, incisions [Z] should be made as suggested by *Schuchardt* (1966). This operation should be performed in spite of the expected unfavourable anatomical results. A favourable prognosis for very or fairly good articulation verges on 85%.

4. Submucous cleft palate should, without exception, be repaired with the bridge flap technique [von Langenbeck or Axhausen]. With nearly 90% incontestable functional speech result, these clefts have the most favourable prognosis.

EVEN EARLIER SURGERY

There is a new push on for very early palate surgery, including mucoperiosteal dissections.

In 1977, at the American Cleft Palate Educational Foundation Symposium on the Refinements in Cleft Lip and Palate Surgery held at Northwestern University, Ernest Kaplan of Stanford University made a strong argument for early total closure of the palate cleft. He set 4 to 6 months as the optimum time for palate closure to avoid bad speech habits, stating that

speech results are better if the palate is closed at six months.

He cited the surgeons who have spoken out for earlier palate surgery and its linear relation to better speech results.

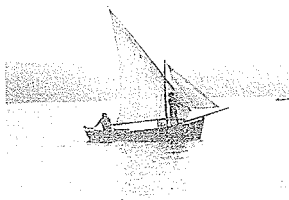
Kaplan further backed his argument for very early total palate surgery by his study of Central American Indians. As found by others, he had noted normal facial growth in the adult unoperated cleft case. Where the lip cleft had been closed surgically but the palate left unoperated, he found maxillary retrusion. In two specific examples in which the palate had been closed but the lip left open, there was normal maxillary growth.

Kaplan also observed that clefts of the secondary palate, including submucous clefts (not including Pierre Robin and Treacher Collins syndromes), often show maxillary retrusion. He suggested that early surgery of the palate in these cases should not be blamed except for possible slight crossbite deformities.

The palate operation he proposed was the standard V-Y Wardill-Kilner palatoplasty, vomer flap, freeing, uniting into a loop and retroposing the levator muscle fibers, and, in about 50 percent of cases, dividing the nasal mucosa from the hard palate edge and sliding into this defect a buccal mucosal flap.

At the same meeting, Desmond Kernahan, who has migrated from Oxford to Liverpool to Winnipeg to Chicago's Children's Memorial Hospital, also rose to the rostrum to champion early palate closure.

LOGICAL TIMING

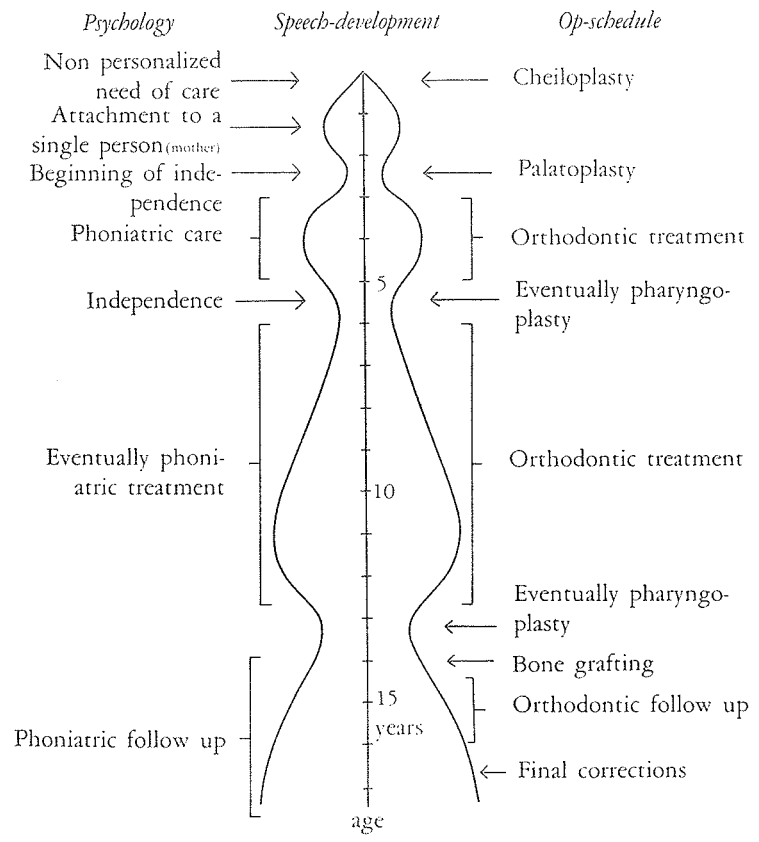


Franz Härle of the University of Freiburg escapes in the summer to the near-deserted fishing village of Pelion in the Aegean Sea to hunt with the fishermen. Yet the majority of his energy is spent in orthodontic surgery, rat research on osteoplasty effects on

mid-face growth and the logical design of treatment timing of palate clefts. It is his conception that with each period of independence in the developing child there comes a greater effort to express himself, and thus orthodontia and surgery should be coordinated in time to facilitate these spurts of vocal effort. As he wrote in 1977:

In 1967 I formed a team with pediatricians, phonodologists, otorhinologists and psychologists to care for about 1000 cleft children. Our main concern was to work out the most appropriate time for the treatment of the cleft child, taking into consideration the psyche, the speech development and the facial growth. The result of this study is described in German as "Freiburger Pfeffermühle" or "pepper-mill of Freiburg." The pepper-mill symbolises the phases of speech differentiation and undifferentiation. Operations in the soft palate and pharynx are only valuable when done in the phase of speech indifferntiation, so that the children can make use of the new anatomical situation when entering the next phase of speech differentiation. At the age of 20 years, and after complete dental rehabilitation, normal speech, satisfactory aesthetics and corrected occlusion, the cleft patient leaves our regular control.

FREIBURG'S PEPPER-GRINDER
PHASE-SPECIFIC DEVELOPMENT
OF THE CLEFT-CHILD



GENERAL PERSONAL TIMING

In Miami at present I have no presurgical orthopedic aid available and thus have been forced into specialized staged surgical action.

Cleft of the velum

At 6 to 9 months retropositioning of the levator muscle into a sling and closure of the soft palate cleft in three layers are done. If the velum is short with good mobility, at 5 years a pushback with an island flap is used. If it is severely short, both an island and a posterior pharyngeal flap will be used in the pushback.

Submucous cleft

At 6 to 9 months, excision of the cleft area and retropositioning of the levator muscle with construction of a sling is followed by three-layer closure. If at 3 to 5 years there is velopharyngeal incompetence with good mobility but shortness, a pushback is used with a bipedicle island flap to the nasal defect. If the mobility is poor, a wide pharyngeal flap will be preferred.

Severe horseshoe cleft of the secondary palate

At 6 to 9 months, the soft palate is closed as much as possible. If molding and growth reduce the hard palate cleft enough, a modified von Langenbeck operation may close the hard palate at 18 months to 2 years. If the defect is still too large, there are two possibilities. The defect can be filled with an obturator or covered with a plate until 4 to 5 years, when an island flap and a pharyngeal flap can be used to aid pushback and closure. Another possibility at 18 months is to fill the nasal side of the cleft with a superiorly based pharyngeal flap and then close the oral side with the aid of von Langenbeck flaps.

Complete unilateral cleft

At 3 weeks of age, ear tubes are inserted, a lip adhesion is constructed and the soft palate is closed as much as possible. It is a temptation to turn a vomer flap at this time to close the anterior cleft but this is usually avoided. At 6 to 8 months, the definitive rotation-advancement lip closure is achieved. At 18

months, the vomer flap and a modified von Langenbeck (minimal incisions and undermining) can be used to close the hard palate defect. If the hard palate defect is too large, requiring extensive surgery, then a plate or obturator is utilized until the age of 3 to 5 years, when more radical surgery can be tolerated. Depending on the shortness of the palate and the amount of soft palate tissue, a pushback with an island flap and/or a pharyngeal flap will be employed.

Complete bilateral cleft

Rubber band traction to a headcap is started against the projecting premaxilla as soon after birth as possible. When the premaxilla is back enough for lip closure and the infant is ready physically for surgery (1 to 2 months), ear tubes are inserted, the soft palate is closed as much as possible and the lip is closed in one stage, bringing the lateral muscles together and banking the fork.

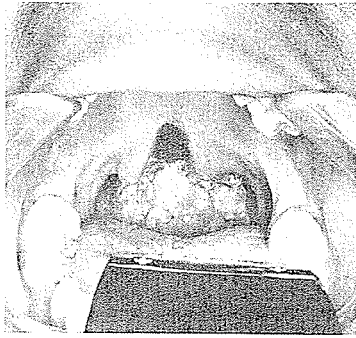
Closure of the lip and soft palate will help mold the premaxilla, and with growth the size of the hard palate cleft should be reduced. At 18 months to 2 years, if the hard palate cleft is reasonable, a modified von Langenbeck will succeed; and if the premaxilla is in good position, the alveolar clefts can be closed. In the event of velopharyngeal incompetence, a pharyngeal flap is first choice at 5 years since in bilateral clefts the amount of mucoperiosteum is limited, reducing the donor area for an island flap.

LOGIC OF VARIATION

In Miami the basis of the general plan is first that the sooner the soft palate is approximated the sooner coordination begins between the velum and the pharyngeal musculature. Early adhesion or closure of the lip cleft molds the premaxilla and maxilla into alignment. This action, with the aid of growth, will decrease the hard palate defect, making possible a modified and less radical closure of the hard palate at optimum speech age. There is then a good chance that 75 percent of the patients will develop speech within normal limits without further surgery. The amount of

subsequent maxillary deformities is consequently reduced. At 5 years, when the major portion of the maxillary growth has been completed, more extensive and imaginative surgery is justified to correct velopharyngeal incompetence in the other 25 percent, so that by school age all should be well.

P. S .



While we are racing toward earlier surgery, it is well to ponder that there is an occasional patient who has had no closure of his palate cleft but has adjusted his pharyngeal musculature, tongue and palatal halves so that he can speak within normal limits. A 24-year-old black woman with an unoperated cleft of the soft palate and perfectly normal speech was seen when she brought her daughter with a cleft of the secondary palate into clinic. Timing of the surgery (in fact, surgery itself) was not important in *this* individual, but her child's cleft will be closed as soon as it is physically feasible—I suppose. . . .

The patients with palate clefts who can adapt without surgery are fascinating when you consider the problems operated palates experience. Then, to add further to the surgeon's ego deflation, a discussion during the 1969 Chicago Cleft Palate Symposium is recalled, when Jan Dreyer of the University of the Witwatersrand, Johannesburg, announced:

Our cleft palate dogs are able to bring the two halves of the soft palate together after only two months and without treatment at all. Also they are able to lap food and they have no nasal bark.

Richard Cole of Lancaster countered:

In other words, they don't say "Mark, Mark?"

Dreyer elaborated:

If these dogs get excited they do have a nasal bark but if not excited, they are able to control and approximate the two edges of their soft palates.