

Primary Veloplasty: Long-Term Results without Maxillary Deformity. A Twenty-five Year Report

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Primary veloplasty during the first year of life enables normal growth of the upper jaw and of the facial skeleton in patients with clefts. In spite of the remaining cleft in the hard palate, intelligible speech can be learned. The closure of the residual cleft of the hard palate is generally postponed until the age of 12 to 14 years, when the normal growth of the jaw is virtually completed. This method has been used in the clinic by the author and his father for thirty years. The results after primary veloplasty for some hundred adult patients show normal maxillary and cranial growth both clinically and radiologically.

Primary veloplasty operations constitute acceptable restorative surgical treatment of the maxilla. Various problems of timing and methods of cleft palate treatment are discussed. The author's cases are summarized.

Improvements in surgical techniques since the 1920's have unfortunately not greatly diminished the incidence of post-operative maxillary deformities in patients with cleft palate. Ritter (1948) and Rosenthal (1951) drew attention to subsequent malformation arising out of early plastic surgery to the palate, while studies of patients with cleft palate who had had no surgery showed that severe deformities of the maxilla had not occurred.

Herfert (1953, 1958) has shown by means of animal experiments that early operations on the hard palate nearly always inhibit the growth of the jaw. Later jaw deformities often result from extensive scars. These findings have recently been confirmed by tests on animals carried out by Lynch and Peil (1966) and also by Kremenak, Huffmann, and Olin (1967).

The jaw and palate, however, develop along normal lines if the soft palate is closed during infancy by means of primary veloplasty. The residual cleft in the hard palate remains. The cleft becomes narrower with growth of the palate without causing compression of the jaw. The surgical technique may be seen in Figure 1. The edges of the soft

palate cleft are dissected into three layers, and a path is dissected through a lateral incision on both sides. Through these incisions and paths, a rubber-band is inserted by means of special needles, and then small foam-rubber sponges are inserted. The cleft is then repaired, suturing each layer separately. At the end of the operation, the tension of the rubber-band is adjusted, and the oral ends of the rubber-band are connected to a thread. The rubber-band is removed after seven days.

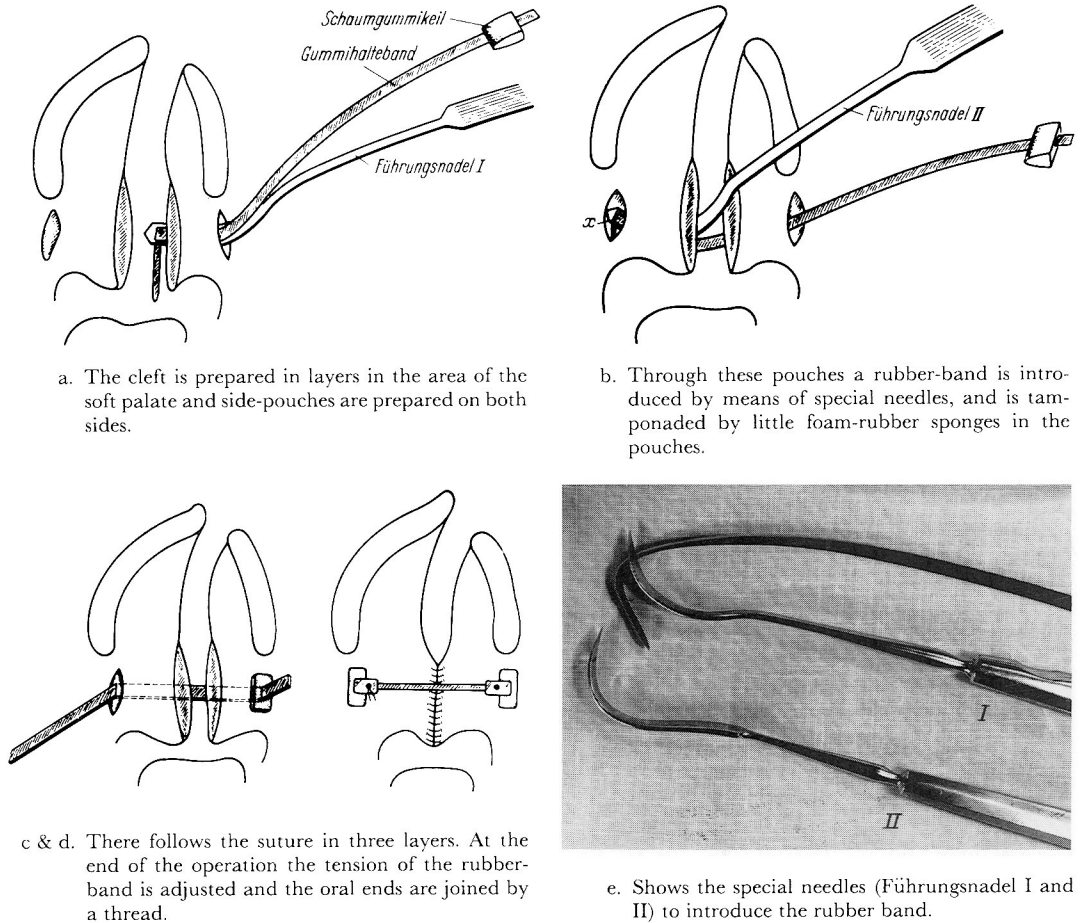
The author's father, Hermann Schweckendiek, started to perform primary veloplastic operations in 1944 with the objective of creating a soft palate which could function normally. Thus, speech was possible from an early age, and development of the maxilla was not disturbed. He published this method in 1951 and 1955. The same idea was published by Slaughter and Pruzansky in 1954.

Nowadays we perform primary veloplastic operations on patients between six and eight months of age at an average weight of between seven and eight kilograms. Risk is minor, and post-operative complications are rare. Failures are very uncommon. I would like to point out that, during the primary operation, we mobilize the soft parts at the posterior edge of the hard palate by means of lateral incisions in order to bring together the muscles of the palate along the midline with-

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FIGURE 1 a-c. Primary veloplasty.



out tension. We also endeavour at this stage to achieve an elongated palate by the inclusion of the pharyngopalatine arch (Schweckendiek, W., 1963, 1966). See Table 1.

In cases of complete unilateral clefts, we operate on the soft palate first. Three weeks later we perform plastic surgery on the lip. In cases of complete bilateral clefts, we first close one side of the cleft lip and perform primary veloplasty three weeks later. Three weeks after that, we close the other side of the lip and the alveolar cleft. This sequence in the operative procedure is helpful because it means that plastic surgery may be carried out on the lip shortly after the primary operation. At the time of the veloplasty, the oral cleft is wide open. This facilitates surgery. We postpone the repair of the cleft lip (Ullik, 1955). As surgical intervention is restricted to soft tis-

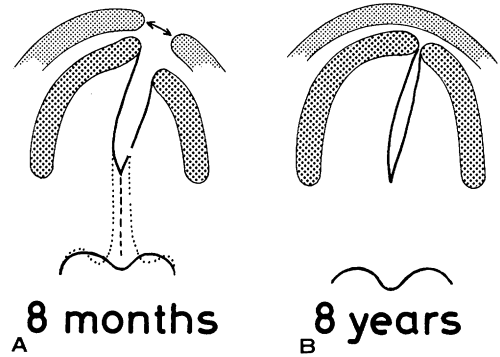
sues, the bony maxilla may be allowed to grow naturally. See Figure 2. On follow-up, minor difficulties had occurred in only three per cent of the patients. However, a number of children required temporary prostheses to cover the cleft so that the spontaneous growth of the upper jaw might continue undisturbed for as long as possible.

The closure of the residual cleft in the hard palate is generally postponed until the patient reaches the age of 12 to 14 years. See Table 2. At that time, normal growth of the jaw is virtually complete. If for any reason the residual cleft has to be closed at an earlier age, for instance, at six to eight years, the jaw must be kept under constant orthodontic supervision to prevent subsequent contraction. Serious consonant articulation problems can generally be avoided, and sibilants and plosives can

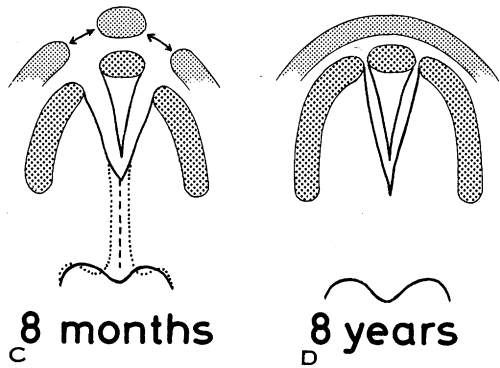
TABLE 1. Timing of primary veloplasty (n = 266)

	<i>CLCP unilat.</i>	<i>CLCP bilat.</i>	<i>C palate soft a. hard</i>	<i>n total</i>
<1 Year	100	35	49	184
>1 Year	31	10	41	82
n total	131	45	90	266

FIGURE 2 a-d. Development of the cleft maxilla after primary veloplastic operations and closure of the cleft lip.



a & b. Model of primary veloplasty at the age of 8 months and 8 years in unilateral CLCP. Undisturbed development of the maxilla.



c & d. The same model in bilateral CLCP.

be pronounced almost normally. See Figure 3.

In all cases of clefts, final assessment of clinical treatment is possible only after the patients have reached adolescence. During recent years, we have published various preliminary reports concerning the effects of primary veloplasty on jaw-formation and speech.

We now have available final results on 266 patients in whom surgical closure of the residual cleft has been performed. On the average, this cleft becomes at least 60 to 70 per cent narrower. In over 95 per cent of all cases, the edges of the alveolar cleft are in close juxtaposition prior to surgical closure. See Figure 4.

We were able to assess the growth of the jaw by means of clinical observations and by use of plaster models for measurement purposes (Hinüber und Schweckendiek, 1973). Here we were able to establish that the development of the jaw following primary veloplasty proceeds in an undisturbed manner. The values for the width of the palatine arch and the length of the maxilla and the base of the skull are nearly the same as are those for normal adults. See Figure 5 and 6.

It is possible to study the growth of the maxilla even after a considerable period of time has elapsed by means of teleradiography. M. Haakonson-Kühn (1969) used this method in 68 patients between 16 and 30 years of age, half of whom had had primary veloplastic operations. Measurements of skull size after primary veloplastic operations and of cleft

TABLE 2. Timing of uranoplasty (n = 266)

	<i>CLCP unilat.</i>	<i>CLCP bilat.</i>	<i>C palate soft a. hard</i>	<i>n total</i>
<12 Years	5	1	7	13
12-14 Years	90	25	54	169
14-16 Years	24	14	12	50
>16 Years	12	5	17	34
n total	131	45	90	266

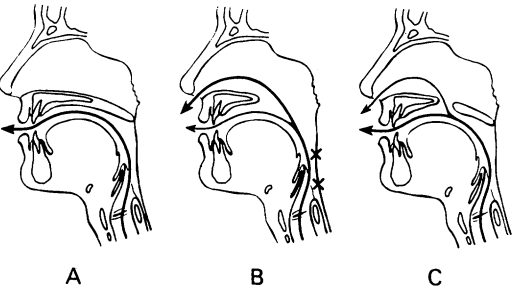
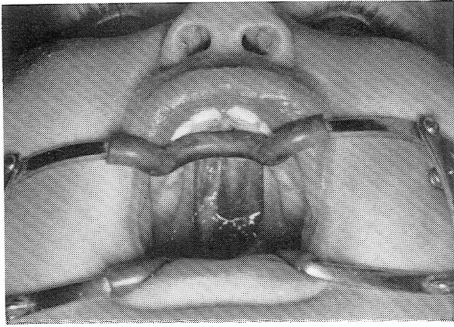
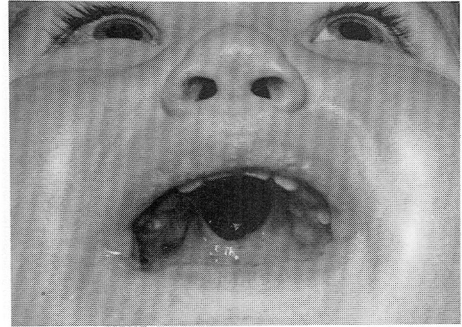


FIGURE 3 a-c. Influence of primary veloplasty at speech. a. Normal palate; b. Non-operated palate. Deep articulation zones (x); c. Primary veloplasty. The deep articulation places can be avoided.

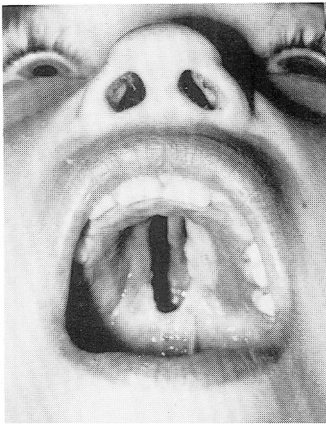
FIGURE 4 a-e. Cleft of the soft and hard palate.



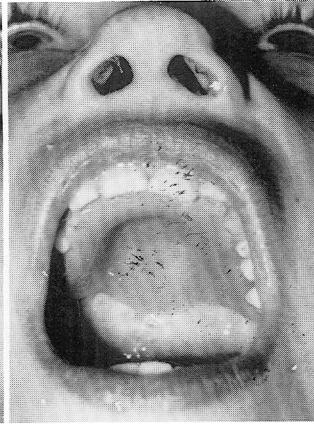
a. ♀, 12 months; excessive wide cleft of hard and soft palate.



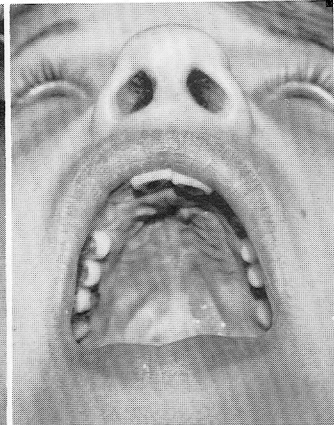
b. After primary veloplasty. Wide residual cleft of the hard palate (13 months).



c. Ten years of age. The residual cleft of the hard palate ("Restspalt") has diminished.



d. The "Restspalt" is closed with a temporary plate.



e. The patient one year after closure of the cleft of the hard palate (15 years).

palates who had not been operated on show practically normal values, while shortening of the maxilla was the rule after uranoplastic operations at an early age.

As far as speech development is concerned, we have found that, during the first few years from the age of about two to five, children with residual clefts had greater difficulties and parents had to spend more time with them than is normally necessary. The intelligence and the temperament of the child play an important part as do family attitudes.

Communicative children in a socially favourable environment will find it easier. In any case most children are able to enter normal schools and have few problems. Should considerable speech difficulties persist after

eruption of the permanent incisors and of the molars, then the residual cleft may be closed temporarily with a palatine plate. Systematic speech therapy by skilled personnel is urgently recommended for these children. See Table 3.

Follow-up investigations into the comprehensibility of speech have shown that speech improved after school entry as is true for most children. Table 4 shows that speech difficulties diminish with age. Most older patients belong to speech groups I and II. That means that their speech is either normal or they have minor errors in articulation. See Table 4. The speech evaluations were carried out by the speech-therapists and the phoniaticians of the University of Marburg (ENT Clinic, Speech Department).

Orthodontic treatment of the maxilla of patients with residual clefts of the hard palate is possible in spite of the residual clefts. It is necessary in those cases where positional abnormalities are present in the teeth close to the cleft.

Patients with very short palates may be treated simultaneously or after the uranoplasty with pharyngoplasty utilizing a pedicled pharynx flap. In nearly all cases, hypernasality is eliminated by this treatment. See Table 5. After primary veloplasty, we find a short or immobile velum in five to 10 per cent of the patients. These individuals need a velopharyngoplasty.

We found that the incidence of ear disease diminishes after primary veloplastic surgery. This has been confirmed by others (Böttcher, 1970; Böttcher and Schneckendiek, 1973; and Grebe, 1966). In 202 patients after primary veloplasty Grebe (1966) discovered hearing loss and middle ear problems in 25 per cent as compared to 57 per cent after other surgery. Böttcher (1970) recognized slight deafness in only 183 of 755 children after primary veloplasty, i.e. 24.3 per cent, while the review of literature shows a higher degree in cleft palate patients. Kittel (1977) confirmed these findings with his own investigations.

Research on the psychological development

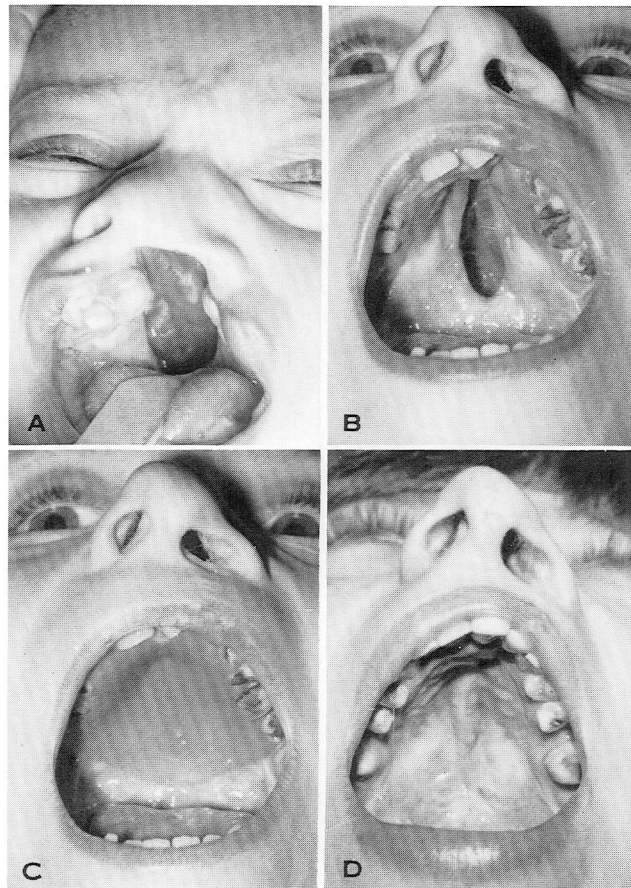


FIGURE 5 a-d. Unilateral cleft lip and cleft palate left.

- a. ♀, 12 months, astenic, 6000 g, wide cleft of the lip, alveolus and palate on the left side before veloplasty and closure of the lip.
- b. 7 years, normal growth of the maxilla, close juxtaosition of the alveolar cleft. The remaining cleft of the hard palate is only small.
- c. 7 years. The residual cleft of the hard palate is closed by a temporary plate.
- d. 16 years. Three years after uranoplasty.

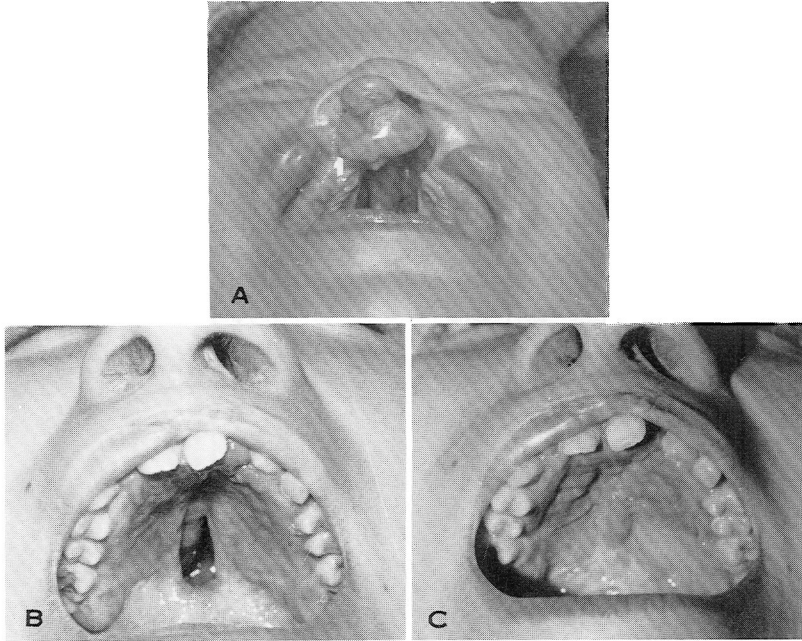


FIGURE 6 a-c. Bilateral cleft lip and cleft palate.

- a. ♀, 4½ months. Before any operation.
 b. 15 years. After repair of the bilateral cleft lip and primary veloplasty in the first year, normal growth of the maxilla, good speech, still a residual cleft of the hard palate.
 c. 16 years. One year after uranoplastic operation. Normal appearance of the maxilla and palate.

TABLE 3. Long term speech results after primary veloplasty (n = 266)

<i>speech group</i>	<i>CLCP unilat.</i>	<i>CLCP bilat.</i>	<i>C palate soft a. hard</i>	<i>n total</i>	<i>%</i>
I normal	78	23	51	152	57.2
II intelligible	45	20	35	100	37.6
III moderate	7	2	3	12	4.5
IV poor	1	0	1	2	0.7
n total	131	45	90	266	100.0

of 200 children with primary veloplasty reveals a near-normal behavior pattern. Two hundred parents and teachers were invited to fill in questionnaires and a large number of the children involved were examined (Schweckendiek and Danzer, 1970). We established that patients are able to choose trades and professions according to their true ability and talents and that they may thus be regarded as fully rehabilitated.

Satisfactory long-term results have been achieved with a minimum of surgical procedures and at very slight risk to the little patients. The results may be regarded as good in terms of facilitating the development of normal speech and very good in terms of

TABLE 4. Speech development in cleft palate patients with relation to the age (absolute numbers)

<i>age</i>	<i>n</i>	<i>speech group</i>			
		<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
4-6	118	20	41	51	6
7-10	123	29	46	38	10
11-14	99	29	53	17	—
15 and more	124	50	54	19	1
	464	128	194	125	17

Speech group I, Normal speech; group II, Intelligible; group III, Moderate, and group IV, Poor.

It should be particularly noted that speech groups I and II become larger with increasing age as would be expected. The residual cleft has usually been closed in patients over 15 years of age.

TABLE 5. Timing of treatment for clefts in Dr. Schweckendiek's Clinic

Type of cleft	primary treatment	secondary treatment	remarks
Cleft lip	7-8 months:	From 16 years:	
Cleft lip and alveolus	Lip repair and reconstruction of the floor of the nose	Corrections of lip and nose	From 5 years orthodontic treatment
Cleft lip and palate	7-8 months: Primary veloplasty 3 weeks later lip repair and reconstruction of the floor of the nose	12-14 years: Uranoplasty 16 years: Corrections of lip and nose	From 4 years speech therapy from 14 years velopharyngo plasty (if necessary)
Cleft palate only	7-8 months: Primary veloplasty	12-14 years: Uranoplasty	

enabling the jaw and face to develop normally. We, therefore, believe that we are justified in continuing to recommend primary veloplasty for the rehabilitation of patients suffering from cleft lip and palate (Schweckendiek, W., 1972).

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