Roentgencephalometry was used in a study of 30 boys and 30 girls with isolated cleft palate prior to palatoplasty. Their ages ranged from 3.5 to 4.5 years. These patients were compared with a control series and with a group of 20 boys with unilateral cleft lip and palate, examined similarly prior to palatoplasty. The isolated cleft palate (CP) group showed four basic differences from the control group: a shortening of maxillary depth and mandibular length (body and ramus), a reduction of the posterior height of the upper face, and a marked widening of the nasal cavity. In contrast to the unilateral cleft lip and palate group the CP group failed to demonstrate a shortening of the anterior height of the upper face or an elongation of the lower face. There was also no indication of a posterior displacement of the upper jaw, of a dentoalveolar retroinclination of the maxilla, or of an increase of the interocular distance. The observed shortening of both jaws in the CP group might be of importance in understanding the pathogenesis of isolated cleft palate. Unilateral cleft lip and palate was not associated with a reduction of the depth of the upper jaw, although the observed shortening of the lower jaw and of the posterior height of the upper face and the widening of the nasal cavity were similar to those seen in isolated cleft palate.

In a previous study we described changes of craniofacial morphology in boys aged 5 years with unilateral cleft lip and palate prior to primary palatoplasty (Šmahel and Müllerová, 1986). Even at this early age it was possible to observe most of the basic craniofacial deviations seen in adults with clefts (Šmahel and Brejcha, 1983): reduced height of the upper face, maxillary dentoalveolar retroinclination, posterior displacement of the upper jaw, widening of some structures of the maxillary complex (nasal cavity and interocular distance), and deficient growth of the mandible associated with changes in its shape. Maxillary depth alone remained unchanged. A soft tissue analysis showed a shortening of the length of the upper lip without any reduction in its thickness.

In another study dealing with adults with isolated cleft palate, it was shown that many of the above-mentioned deviations did not develop (Šmahel, 1984a). There was neither reduction in the height of the upper face nor a dentoalveolar maxillary retroinclination. We did not find an increase in the width of the nasal cavity or of the interocular distance, or a posterior displacement of the maxilla as a whole. The length and thickness of the lip were not reduced. Thus, in adults with isolated cleft palate only two (but very important) deviations were seen: a shortening of maxillary depth and a deficient growth of the mandible associated with corresponding changes of its shape.

The purpose of the present study was to ascertain whether these, or other, changes occur in children with isolated cleft palate prior to palate repair or whether they develop later during subsequent growth. The results obtained could be helpful in understanding the causes of individual deviations in persons with isolated cleft palate and allow some insight into the pathogenesis of these malformations.

**Material and Method**

We examined 30 boys and 30 girls with isolated cleft palate (CP); they were free from any associated malformations, and ranged in age...
from 3.5 to 4.5 years. The mean age of the boys was 4 years, 1 month, and of the girls exactly 4 years. Complete clefts up to the incisive foramen were present in four boys and five girls, incomplete clefts involving a smaller part of the hard palate in 21 boys and 18 girls, and five boys and seven girls had clefts of the soft palate alone. Submucous clefts were not included. The patients had not been subjected to any surgical or orthodontic therapy.

The control group consisted of 27 normal boys and 30 normal girls, 4 to 6 years of age, who were studied previously for other reasons (Havlová, 1969). The mean age of the boys was 5 years, 2 months, and for the girls was 4 years, 11 months. The controls were selected at random from kindergartens in Prague. All of these children had deciduous incisors present, and none of them had received any orthodontic treatment. The series did not include individuals with severe malocclusions. Since radiographic studies of the normal population are not allowed without special permission, it was not possible to carry out these studies on a new group of controls matched to the study group in age. Because of the 1-year difference between the mean age of our patients and of the controls, linear dimensions were expressed and compared in terms of percentages. Angles and some special dimensions did not undergo substantial changes during 1 year and therefore allowed a direct comparison.

A second "control" group consisted of 20 boys with unilateral cleft lip and palate (UCLP) studied prior to palatoplasty. All of these children were examined at the mean age of 4 years, ± 2 months. Thirteen individuals had complete clefts and seven had incomplete clefts; three of the latter had a soft tissue bridge, and the other four both a soft and a bony bridge across the cleft. Cheiloplasty was performed at the age of 5 to 11 months (average 7.8 months) according to Tennison or Veau, in association with primary osteoplasty. Primary osteoplasty was not carried out in three individuals with a bony bridge. Presurgical oral orthopaedics was not used. This series allowed an assessment of the differences between craniofacial morphology in both types of clefts prior to primary palate repair. Since the changes in the craniofacial configuration in unilateral clefts were defined in our previous study (Šmahel and Müllerová, 1986), this comparison allowed us to draw conclusions concerning the deviations occurring in individuals with isolated cleft palate.

Cephalograms were obtained in the manner described in an earlier report (Šmahel and Brejcha, 1983). The craniometric points used are marked in Figures 1 and 2, and the reference lines are shown in Figure 3. All films were measured by one of the authors. Distances from points to reference lines were measured as perpendiculars from the point to the line, for example Ptm-VL; angles are designated by three reference points (e.g., S-N-Ss) or by the intersection of two lines (e.g., ML/RL); percentages are indicated as N-SP\%N-Gn (N-SP in terms of the percentage of N-Gn); and soft tissue thicknesses are marked in Figures 1 and 2, and the reference lines are shown in Figure 3. All films were measured parallel to the palate line PL from individual points, Id and Sm' as the minimum thickness and Plt' perpendicular to the facial line N'–Pg'. The overjet was determined as the distance between the edges of the upper and lower incisors, parallel to the plane of occlusion (marked as Is-II). The results were analyzed statistically with the t-test. The results obtained in all groups are presented in Table 1. The comparison of linear dimensions in boys 4 years of age with isolated cleft palate with those with unilateral cleft lip and palate is presented in Table 2.

**RESULTS**

The results obtained in all groups are presented in Table 1. The comparison of linear dimensions in boys 4 years of age with isolated cleft palate with those with unilateral cleft lip and palate is presented in Table 2.

**CP Versus Controls**

Only a few differences from the controls were found in the isolated cleft palate group prior to palatoplasty. Both sexes showed a shortening of maxillary depth compared to the length of the anterior base (Ss-Pmp\%N-S). The lengths of the mandibular body (Pg-Go\%N-S) and ramus (Cd-Go\%N-S) were smaller as well. This shortening was identical to that of the upper jaw (2 to 3%). There was a marked widening of the nasal cavity (Apt-Apt\%Zy-Zy). This difference was significant even in comparison to the older controls (Apt-Apt). The retroinclination of the palatal plane (PL/VL) in the presence of an adequate anterior height of the upper face (N-Sp\%N-Gn) was characteristic of the shortening of the posterior height of the upper face (Pmp-NSL).

Some additional differences were observed only in one sex. Since they were small and at a low level of significance, they were not of major importance and probably represented sequelae of the above described significant changes. Boys had a larger angle of inclination of incisors in relation to the retroinclined palatal plane (ISL/PL); but the inclination towards the cranial base (NSL) was unchanged. Girls had a slight retrusion of the maxilla (S-N-Sp, S-N-Ss, S-N-Pr) because of the more marked shortening of the maxillary depth as compared to boys (Ss-Pmp\%N-S). The slope of the mandibular body (ML/VL) was steeper, and the gonial
FIGURE 1 Cephalometric points used for the assessment of lateral x-ray films: Ar (articulare) = intersection of inferior contour of the clivus and posterior contour of the ramus; Ba (basion) = most posterior inferior point on the clivus; Cd (condyion) = most superior point on the condylar head; Gn (gnathion) = lowest point of the mandibular symphysis; Go (gonion) = point on the angle of the mandible determined by the axis of ML/RL angle; Id (infradentale) = point of the gingival contact with lower central incisor; Ii (incision inferius) = incisal tip of the lower central incisor; Is (incision superius) = incisal tip of the upper central incisor; Li (labrale inferius) = margin of the vermilion of the lower lip; Ls (labrale superius) = margin of the vermilion of the upper lip; N (nasion) = most anterior point on the frontonasal suture; N’ (soft nasion) = intersection between NSL and soft profile contour; Pg (pogonion) = most anterior point on the bony chin; Pg’ (soft pogonion) = most anterior point on the soft tissue chin; Pgn (prognathion) = point on the mandibular symphysis farthest from Cd; Pl (pala- tale) = most posterior point of the palatal processes; Pmp (pterygomaxillare palatinum) = intersection of palate line with the fissura pterygomaxillaris; Pr (prosthion) = point of gingival contact with upper central incisor; Prn (pronasale) = point on the top of the nasal bone; Pt (pterygomaxillare) = most inferior point of fossa pterygopalatina where fissura pterygomaxillaris begins; Rhi (rhinion) = most inferior point on the nasal bone; Rhi’ (soft rhinion) = point on the soft profile contour over Rhi; S (sella) = center of sella turcica; Sm (supramentale) = deepest point on the anterior contour of the mandibular symphysis; Sm’ (soft supramentale) = deepest point on the soft contour of the lower jaw; Sn (subnasale) = point at which columella merges with the upper lip; Sp (spinale) = tip of the anterior nasal spine; Ss (subspinale) = deepest point of the subspinal concavity; Ss’ (soft subspinale) = deepest point of the upper lip; Sto (stomion) = point of contact of the upper and lower lip.

FIGURE 2 Cephalometric points on anteroposterior x-ray films: Ag (anteagonion) = highest point in the antegonial notch; Apt (apertion) = most lateral point of the nasal cavity; Cd1 (condyion laterale) = most lateral point on the condylar head; Ek (ectoconchion) = most lateral point of the orbital contour; Go (gonion) = most lateral point of the mandibular angle; Li (laterofrontale) = point of intersection between lateral margin of the ala major and latero-orbital margin of the proc. zygomaticus of the frontal bone; Lo (lateroorbitale) = point of intersection between lateral margin of the ala major and contour of the orbita; Mo (medioorbitale) = most medial point of the orbital orifice; Zy (zygion) = most lateral point on the zygomatic bone.

FIGURE 3 Reference lines plotted on lateral x-ray films: NSL = line through N and S; VL = perpendicular to NSL through S; PL = line through Sp and Pl; CL = line through Pg and Id; ML = tangent to the mandibular body through Gn, RL = tangent to the mandibular ramus through Ar, MAL = line through Pgn and Cd, ASL = tangent to the maxillary alveolar process through Pr, ISL = line through Is and Pr, IIL = line through Ii and Id, IGo = tangenta gionion point.
angle was more obtuse (ML/RL, Fig. 4). These findings might represent initial changes in the shape of the mandible. The acute N-S-Cd angle was related to the anteriorly displaced ramus, which occurred because of the smaller size of the cranium in younger individuals with isolated cleft palate (Fig. 4). Thus, prior to palatoplasty in isolated cleft palate, there were no changes in most of the craniofacial parameters. This is clearly seen in the craniograms (Figs. 4 and 5), which are smaller in size in younger individuals with cleft palate than in older controls, yet show similar proportions.

The testing of the differences between the two sexes in the controls disclosed that boys have a tendency towards retrognathia of the profile as compared to its contour in girls (S-N-Rhi to S-N-Pg and the related characteristics Pgn-Go%N-S, Ss-Pmp%N-S, S-N’Ss!, S-N’Pg'). This finding is in agreement with other reports in the literature (Beaton and Cleall, 1973).
TABLE 2  Mean Values of Linear X-ray Cephalometric Characteristics in 4-Year-Old Boys with Isolated Cleft Palate (CP) and with Unilateral Cleft Lip and Palate (UCLP)

<table>
<thead>
<tr>
<th>Variable</th>
<th>CP</th>
<th>UCLP</th>
<th>Variable</th>
<th>CP</th>
<th>UCLP</th>
</tr>
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<tr>
<td>Base</td>
<td></td>
<td></td>
<td>Mandible</td>
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<td></td>
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<tr>
<td>N-S</td>
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<td>62.70</td>
<td>Pgn-Go</td>
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<td>53.80</td>
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<td>S-Ba</td>
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<td>Cd-Go</td>
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<tr>
<td>N-Ba</td>
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<td>92.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facial Height</td>
<td></td>
<td></td>
<td>Soft Profile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Rhi</td>
<td>17.77</td>
<td>19.50*</td>
<td>N'-Prn</td>
<td>40.13</td>
<td>40.50</td>
</tr>
<tr>
<td>N-Sp</td>
<td>40.97</td>
<td>39.45*</td>
<td>N'-Sn</td>
<td>45.80</td>
<td>46.35</td>
</tr>
<tr>
<td>N-Pr</td>
<td>57.17</td>
<td>57.58</td>
<td>N'-Sto</td>
<td>63.20</td>
<td>65.55*</td>
</tr>
<tr>
<td>N-Gn</td>
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<td>97.10</td>
<td>N'-Pg</td>
<td>88.00</td>
<td>91.50</td>
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<tr>
<td>Sp-Is</td>
<td>23.96</td>
<td>25.89***</td>
<td>Prn-Sn</td>
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<tr>
<td>Lt-Gn</td>
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<td>34.50**</td>
<td>Prn-Sp</td>
<td>19.17</td>
<td>17.10***</td>
</tr>
<tr>
<td>Id-Gn</td>
<td>25.77</td>
<td>27.85***</td>
<td>AP Projection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp-Pg</td>
<td>51.27</td>
<td>55.15***</td>
<td>Zv-Zv</td>
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<tr>
<td>Pmp-NSL</td>
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<td>Go-Go</td>
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<tr>
<td>S-Go</td>
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<td>57.55</td>
<td>Cdl-Cdl</td>
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<td>Facial Depth</td>
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<td>Mo-Mo</td>
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<td>23.85*</td>
</tr>
<tr>
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<td>45.90</td>
<td>Lo-Lo</td>
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<td>92.70</td>
</tr>
<tr>
<td>St-Pmp</td>
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<td>42.90*</td>
<td>Ek-Ek</td>
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<td>93.35</td>
</tr>
<tr>
<td>Pmp-Ba</td>
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<td>39.50</td>
<td>Lf-Lf</td>
<td>101.13</td>
<td>100.90</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Apt-Apt</td>
<td>28.47</td>
<td>28.85</td>
</tr>
</tbody>
</table>

* Significant differences between CP and UCLP (*p<0.05, **p<0.01, ***p<0.001)

UCLP Versus Controls

The differences from controls in a group of boys 4 years of age with unilateral cleft lip and palate (Table 1) were in perfect agreement with our previous findings in patients older by 1 year (Šmáhel and Müllerová, 1986). Comparisons of the percentage values yielded similar results as direct comparisons of linear measurements performed in the above mentioned earlier study. The main differences included: (a) the reduction of the anterior height of the upper face (N-Sp%N-Gn); (b) the elongation of the nasal bones (N-Rhi%N-Sp), the dentoalveolar part of the maxilla (Sp-Is%N-Pr), the anterior mandibular height (II-Gn%N-Gn), and the lower face height (Sp-Pg%N-Gn); (c) a posterior displacement of the maxilla (Ptm-VL, Pmp-VL); (d) a maxillary dentoalveolar retroinclination (ASL/PL, ISL/PL); (e) a wider nasal cavity (Apt-Apt%Zy-Zy); and (f) an increased interocular distance (Mo-Mo%Ek-Ek). The shortening of the mandibular body and ramus was at the p<0.1 level of statistical significance (Pgn-Go%N-S, Cd-Go%N-S). Maxillary depth was normal (Ss-Pmp%N-S).
CP Versus UCLP:

Observed differences between the unilateral cleft group and the isolated cleft palate group were similar to those between the unilateral group and the normal controls, except for a few parameters. This confirmed the similarity between isolated cleft palate individuals and controls. An exception was the width of the nasal cavity (Apt-Apt%Zy-Zy), which increased in cases of both unilateral clefts and isolated cleft palate. In the isolated cleft palate group, the gonial angle (ML/RL), the chin angle (CL/ML), and the lip thickness at the Pr and Id level showed values between the controls and the unilateral clefts. The depth of the upper jaw (Ss-Pmp%N-S), which was not reduced in UCLP, differed significantly from the shortening of the jaw seen in isolated cleft palate. This situation was confirmed by the comparison of maxillary depths (Ss-Pmp), even though a smaller difference in the depth of the maxilla at the palate level (SP-Pmp) was shown (Table 2). It was proved that this apparent disagreement was because of a more anterior position of the permanent incisors within the jaw in UCLP, which at this age, were at the level of the subspinal concavity. Because of a lack of space, they protruded into the concavity and disfigured it. This resulted in a displacement of the point subspinale in an anterior direction and exerted an influence on the measurements of maxillary depth. This also contributed to an increase in the angle of sagittal maxillomandibular relations (Ss-N-Sm) and resulted in a significant difference in lip thickness at this level (Ss) from the values observed in isolated cleft palate. This situation is illustrated by the craniogram in Figure 6.

The comparison of linear dimensions in boys with isolated cleft palate and in individuals with unilateral cleft lip and palate (Table 2, Fig. 6) confirmed that unilateral clefts were associated with a reduction of the height of upper face (N-Sp) and elongation of the nasal bones (N-Rhi), the maxillary dentoalveolar component (Sp-Is), and the anterior height of the mandible (Ii-Gn, Id-Gn). These last two characteristics were involved in the elongation of the lower face (Sp-Pg) and of the whole face (N-Gn, N'-Pg'). The length of the mandibular body (Pgn-Go) and ramus (Cd-Go) did not differ between the two groups, confirming an identical shortening in both types of clefts. The same situation was present in measurements of the posterior height of the upper face (Pmp-NSL). The reduction of this dimension was confirmed by the retroinclination of the palatal plane (PL/VL). In unilateral clefts, the flattening of the apex nasi resulted in a significant reduction of nasal depth (Prn-Sn, Prn-Sp). There were no differences between the parameters of the cranial base in either series (N-S, S-Ba, N-S-Ba). The characteristics measured in the anteroposterior projection showed a single deviation, a larger interocular distance (Mo-Mo) was associated with a unilateral cleft lip and palate.

DISCUSSION

The data in this study demonstrated four deviations of the configuration of the craniofacial complex in isolated cleft palate prior to palatoplasty. They included the shortening of both jaws and of the posterior height of the upper face and the widening of the nasal cavity. Our approach did not allow us to assess the length of the cranial base, which was used as a reference dimension. However, we demonstrated a shortening of this dimension in unilateral cleft lip and palate individuals (Smahel and Müllerová, 1986), and since the length of the presellar (N-S) and postsellar (S-Ba) part of the cranial base in isolated cleft palate did not differ from these data (Table 2), a shortening of the length of the cranial base could be assumed in the isolated cleft palate subgroup as well. This is in agreement with the observations of Dahl et al (1982) and provides evidence that the shortening of the upper and lower jaw expressed in absolute values is even more conspicuous than when described in terms of relation to the length of the anterior cranial base.

Dahl et al (1982) ascertained a shortening of both jaws as early as the age of 2 to 3 months in infants with isolated cleft palate as compared to infants with incomplete cleft lip. The shortening of the lower jaw might result from im-
paired growth of mandibular anlage during embryonal life, which represented one of several causal mechanisms of the development of isolated cleft palate demonstrated in experimental animals (Jelinek and Peterka, 1977; Diewert, 1979). Our findings were in agreement with this concept. A reduction in size of the mandible in children with cleft palate was also reported by Nakamura et al (1972). A shortening of the depth of the maxilla is suggestive of an early impairment of its growth, and it could reflect some other mechanism for the development of cleft palate, such as hypoplasia of the maxillary and therefore also of the palatine processes. The shortening of the dentoalveolar arch prior to palatoplasty was demonstrated by Peterka (1979). A similar shortening of both jaws, prior to the repair of the palate did not impair the contour of the profile. This apparent harmony could lead to the erroneous belief that there were no deviations whatsoever.

A shortening of the posterior height of the upper face was also described by Dahl et al (1982), and it was believed that it could be related to an interference in the interaction of this region with the nasal septum, which influences vertical growth. Therefore, in cleft lip and palate, the anterior height of the upper face is reduced as well (Smahel and Mullerová, 1986). However, we failed to demonstrate a reduction of the posterior upper face height in adults with isolated cleft palate (Smahel, 1984a). The reduction of this deviation in cleft lip and palate with advancing age was described by Hayashi et al (1976) and Hellquist et al (1983). Whether or not this improvement is related to the renewed contact of the reconstructed palate with the nasal septum after the ossification of the former remains unsettled.

The widening of the nasal cavity represented the last change recorded in individuals with isolated cleft palate prior to surgical repair. This finding was also in agreement with the observation of Dahl et al (1982). The enlargement reflected the interruption of the osseous continuity of the palate. A widening of the nasal cavity and of neighboring structures in all types of clefts with an involvement of the palate prior to palatoplasty was demonstrated early by Subtelny (1955), and Coupe and Subtelny (1960). In isolated cleft palate, this increased width almost disappeared in adulthood (Smahel, 1984a) due, undoubtedly, to the tension exerted by the repair, which impedes the growth in width of the maxilla and leads to a narrowing of the alveolar arch. Thus, of the four preoperative deviations, only two were recorded in adults, i.e., the shortening of both jaws. The maxillary shortening was progressive after palatoplasty. In addition, some deviations occurred in adults, which were thought to be derived from the reduction in the size of both jaws, including the changes in mandibular shape (Smahel, 1984a). The latter were mostly insignificant before palatal surgery, as documented by the findings reported by Dahl et al (1982) as well.

Craniofacial deviations in 4-year-old boys with unilateral cleft lip and palate were in good agreement with earlier findings in 5-year-old children with this type of cleft (Smahel and Müllerová, 1986). The only difference observed was a more marked convexity of the profile (N-Ss-Pg) with a larger angle of sagittal maxillomandibular relations (Ss-N-Sm) at the age of 4 years. This difference was because of the described anterior position of the unerupted permanent incisors, which at the age of 5 years were situated below the level of the subspinal concavity and acted less on the position of the subspinal point than at the age of 4 years. This influence of the incisors and the dislocation of maxillary segments most probably account for the findings of some investigators who described a larger depth of the maxilla in early infancy in cleft lip and palate individuals than in controls (Bishara et al 1979). Similarly, this fact could partially account for the significant increase in maxillary depth in unilateral clefts compared to isolated cleft palate that was reported by other authors as well (Krogman et al, 1975, 1982). These investigators showed that the observed difference was produced by the anterior part of the maxilla (dimension spina-key ridge). Cephalograms provided evidence that, in individuals with isolated cleft palate, the erupting permanent incisors had plenty of space and were situated more distally within the alveolar process than in the unilateral clefts; their position was similar to the controls. Therefore, they do not produce a deformation of the subspinal concavity and of the anterior profile of the alveolar process.

Another difference observed was the unchanged thickness of the upper lip (Ss₁) at the age of 4 years. At the age of 5 years, the thickness of the lip was increased because of alveolar retroinclination; but, at the age of 4 years, the thickness of the lip was reduced to the norm by the deformation of the subspinal concavity. Thus, this characteristic was exposed to the influence of secondary factors.

At 4 years of age, the shortening of the upper lip (Sn-Ls) was not yet significant, and there was a slight overjet (Is-I₁). At the age of 5 years, there was already an edge-to-edge bite. No other differences were disclosed.

In contrast to isolated cleft palate, the depth of the upper jaw was not reduced in unilateral clefts. This could be because of the distortion of
the maxillary segments and of the anterior position of the nonerupted permanent incisors. These factors should be elucidated more precisely, although they account for small differences only.

We failed to discover other reports in the available literature describing a comparison of preoperative craniometric data in isolated cleft palate as compared to appropriate controls. Our study was most similar to the report by Dahl et al (1982), who compared findings obtained in a group of children with isolated cleft palate with those from a group with an incomplete unilateral cleft lip (children aged from 2 to 3 months), and the study of Krogman et al (1975), dealing with the comparison of isolated cleft palate with cleft lip and palate in patients 0-6 years of age. All children within their first year of life were examined prior to palatoplasty. Both studies pooled children of both sexes.

Besides the shortening of the anterior cranial base, both jaws and the posterior height of the upper face, and the widening of the nasal cavity, Dahl et al (1982) described some secondary changes in isolated cleft palate: retroinclination of the palatal plane, retrognathia of both jaws, a steeper slope of the mandibular body, and a more acute posterior angle of the palate (N-S-Pmp), indicating that the maxilla was not displaced backward in relation to the cranial base. They failed to demonstrate differences in the anterior height of the upper face, the angle of the cranial base, the shape of the mandible, the convexity of the profile, vertical maxillomandibular relations, or other characteristics. All these findings are in agreement with our data and are compatible with the well-founded assumption that cleft lip alone (used as controls) is not associated with marked facial-skeletal changes as demonstrated in adults (Dahl, 1970; Šmahel, 1984b). An increased interocular distance was ascertained in a series of individuals with cleft lip. This enlargement was demonstrated repeatedly in cleft lip, with or without cleft palate (Dahl, 1970; Aduss et al, 1971; Farkas and Lindsay, 1972; Dahl et al, 1982; Šmahel, 1984b).

The study of Krogman et al (1975) was consistent with our second method of investigation, i.e., the comparison of isolated cleft palate with cleft lip and palate. In cleft lip and palate, those authors found a larger depth of the upper jaw due to the elongation of its anterior segment (spinkey ridge) and a smaller height of the upper face. They failed to disclose any differences in the length of mandibular body and ramus or the dimensions of the cranial base. These findings were equally in agreement with our results.

Thus, the results obtained so far indicate an adequate anterior growth of the upper jaw in unilateral cleft lip and palate prior to palatoplasty. The shortening of maxillary depth was readily demonstrated in isolated cleft palate, yet was of little practical importance. It might be more important in etiopathogenetic considerations.

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