

Table 2. Intubation-associated changes in palatal configuration and length.

studies	Patients	Method and validity of method	Results																																								
[24]	-25 2- 5 Y old children, intubated for longer periods as neonates. - GA 29.3 W (SD 4.1, range 24- 32 W). - Mean BW 1089 g. (SD 420, range 530- 1828). - Mean length of orotracheal intubation 34 D (SD 28.2, range 7-90).	- Impression with thermoplastic material, dental cast.	- All children had high palatal vault. - 28 % had palatal grooving. - 16 % had posterior crossbite. - Children intubated ≤ 15 D did not have palatal grooving or posterior crossbite. - Children intubated ≥ 30 D had a higher incidence of effects than those intubated ≤ 30 D																																								
[30]	-See Tab. 1.	- See Tab. 1.	-Groove still present at 12, 13 and 12 MO.																																								
[37]	- See Tab 5.		-Once the tube was removed, the anterior gum pad remoulded in most instances. -See Tab. 2.																																								
[8]	-See Tab 2.	- See Tab. 2.																																									
[48]	- <u>Study group: PT, LBW, intubated (59 % Caucasian, 54 % male):</u> - <u>43 3-5 Y old intubated LBW</u> - Mean BW 992.6 g (SD 196, range 595- 1247). - Mean GA 28.9 W (SD 2.7, range 25- 36). - Mean orotracheal intubation time 18.3 D (SD 21, range 1-99). - Mean orogastric intubation time 55.6 D (SD 31, range 6- 169). - <u>47 7-10 Y old intubated LBW</u> - Mean BW 1044.1 g (SD 288.2, range 537- 1616). - Mean GA 28.7 W (SD 2.6, range 22-33). - Mean orotracheal intubation 26.4 D (SD 31.4, range 1-99). - Mean orogastric intubation time 52.4 D (SD 27.4, range 0-99). - <u>Control group: mainly NBW, non intubated (56 % Caucasian, 51 % M):</u> - 40 3-5 Y old (with four exceptions not intubated and full term, mean BW 3465.0 g. (SD 425.4 (range 2781-4264)). - 44 7-10 Y old, full term, mean BW 3485.9 g (SD 495.4, range 1814-4173). - <u>Exclusion:</u> history of intubation, developmental difficulties, facial abnormalities, neural dysmorphologies, constant finger habits. - <u>drop out study group:</u> 59 %. - <u>drop out control group:</u> 56 %.	- Identification of LBW and neonatally intubated children by medical records. - Intraoral inspection (high vaulted palate = high palate configuration relative to palate size) + - Alginate impressions on pediatric stock trays, poured into stone models (to validate clinical assessment of high vaulted palate and palatal grooving). - Asymmetry measured with a 3-dimensional rectangular cartesian coordinate system with respect to a fixed plane, comparison of values from reference points on contralateral sides to indicate discrepancies of the arch form in width and depth (3-5 Y old: on the lingual margin of central and lateral incisors and second primary molars; 7-10 Y old: correspondingly on the gingiva of the central and lateral incisors, canines and 6-year molars. Measurements by locating the widest aspects of the tooth and reflecting this point to the gingival margin. <u>Palatal width asymmetry:</u> Difference between measurements of the distance of contralateral measuring points to the median palatal raphe. <u>Palatal depth asymmetry:</u> locating the midpoint on a line between each reference point and the raphe and then measuring the vertical distance to the palate. Difference between contralateral sides to determine palatal depth asymmetry. - Vidicom Qualifier 1210 (accuracy 0.001 mm).	<table border="1"> <tr> <td>3-5 Y olds</td> <td>intubated (n= 41)</td> <td>non-intubated (n=41)</td> <td>* p < 0.05</td> </tr> <tr> <td>high vaulted palate</td> <td>63.4 %</td> <td>10.0 %</td> <td>*</td> </tr> <tr> <td>grooved palate</td> <td>14.6 %</td> <td>0.0 %</td> <td>* 1)</td> </tr> <tr> <td>crossbite</td> <td>22.0 %</td> <td>5.0 %</td> <td>* 1)</td> </tr> <tr> <td>palatal width second deciduous molar region</td> <td>24.02 mm</td> <td>25.33 mm</td> <td>*</td> </tr> </table> <table border="1"> <tr> <td>7-10 Y olds</td> <td>intubated</td> <td>non-intubated</td> <td>* p < 0.05</td> </tr> <tr> <td>high vaulted palate</td> <td>61.7 %</td> <td>9.0%</td> <td>*</td> </tr> <tr> <td>grooved palate</td> <td>23.4%</td> <td>0.0%</td> <td>*</td> </tr> <tr> <td>crossbite</td> <td>21.3%</td> <td>2.3%</td> <td>*</td> </tr> <tr> <td>palatal width molar region</td> <td>27.98 mm</td> <td>30.16 mm</td> <td>*</td> </tr> </table>	3-5 Y olds	intubated (n= 41)	non-intubated (n=41)	* p < 0.05	high vaulted palate	63.4 %	10.0 %	*	grooved palate	14.6 %	0.0 %	* 1)	crossbite	22.0 %	5.0 %	* 1)	palatal width second deciduous molar region	24.02 mm	25.33 mm	*	7-10 Y olds	intubated	non-intubated	* p < 0.05	high vaulted palate	61.7 %	9.0%	*	grooved palate	23.4%	0.0%	*	crossbite	21.3%	2.3%	*	palatal width molar region	27.98 mm	30.16 mm	*
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			- Defects were not influenced by length of intubation. - * = chi square test - 1 = results of this analysis are not reliable due to low expected cell frequencies. - Analysis of variance revealed significant relationships between high vaulted palate, palatal grooving, crossbite and both, BW and GA																																								

[49]	- See Tab. 3.	- See Tab. 3.	- Duration of orotracheal intubation did not influence the degree of palatal deformation.
[23]	- 49 PT (23 m, 26 f) - Ø BW 1213 g (range 605 g– 1500 g) - Ø age at impression 3 Y, 3 M (range 26 M to 5 Y, 5 MO); - 18 with endotracheal intubation ¹ ; - 31 without endotracheal intubation and mechanical intubation ¹ - Exclusion: neurological abnormalities, facial dysmorphism, clefts, finger sucking one Y prior to investigation, further intubation after leaving hospital after birth. - - ¹ The authors give contradictory information on intubation, on pp. 33 and 34 of the article, they mention 22 intubated children.	- Dental examination. - Stone models from compound maxillary impression on plastic spoon. - Measurements at the primary lateral incisors, canines and first molars, by drawing tangents to the mesiopalatal and distopalatal surfaces and projecting a line bisecting the angle of the intersection to the gingival margin, reference line was median palate raphe. - Reference point of each tooth at the gingival margin to determine symmetry. - Olivetti inspector machine to determine the 3 dimensional coordinates of the reference points. - Measurements to the nearest 0.1mm. - Accuracy of the measuring method: SD 0.1-0.4 of the 3 measurements taken of any one model; difference between models NS. - Location of reference points on the gingival margins of deciduous lateral incisors, canines and primary molars x, y and z coordinates of reference points determined directly by the Olivetti inspector machine, allowing measurements to the nearest 0.1 mm. - Symmetry of the 2 models taken from each patient showed no statistical significant differences (level of significance: p ≤ 0.1).	- No palatal grooves. - No statistically significant differences between groups. - No palatal asymmetry 2-5 Y after intubation. - Length of intubation does not affect palatal symmetry
[13]	- N = 1 (f), 1230 g, GA 28 W, caesarean section; orotracheal tube for 8 D; Complications: pneumothorax and neonatal jaundice; at 8 D orogastric tube and acrylic feeding plate;	- Impressions at 8 D, 4 and 21 MO	- Normal palatal shape at 8 D; palatal V shape and 'deep groove' at 4 MO.
[13]	- N= 1 (m), 1050 g, GA 28 W, vaginal delivery; orotracheal tube for 4 MO, subsequently orogastric tube and acrylic feeding plate for 3 W	- Impressions at 4, 5, 6, 7, 10, 25 MO - No further description of method given.	- 5 mm deep groove. - After use of a feeding plate reduction in width but not depth of the groove. - Groove persisted until 10 MO of age the (no change in depth but a progressive increase in width).
[17]	- See above.	- See above.	- Six MO after extubation 23 / 40 patients with grooves at the time of extubation returned: - 16 (70 %) had persisting grooves (mean GA 30.5, SD 2.8, intubated mean 86.3 D, SD 62.5). - Other 7 (30%) (mean GA 30.3 W, SD 3.2, intubated 24- 154 D, mean 56.3+/-44.2) had high arched palates.
[16]	- All neonates in the NBICU intubated >2 W; - 40 PT neonates. - GA 25-37 W (mean 30.0 +/- 2.6). - Intubation for 14-243 D (67.6 +/- 51.1).	- Wax impressions of the palate at the time of extubation and six MO later.	- Six MO after extubation 18 / 40 patients with grooves at the time of extubation returned: - none of the palates appeared normal. - 12 (67 %) had persisting grooves (mean GA 31.0 W, SD 2.7, intubated mean 81.6 D, SD 49.9); - the other 6 (33%) (mean GA 30.7 W, SD 3.3, intubated 24-154 D, SD 57+/-48.4) had high arched palates.

BW = birthweight, D = day(s), F = female, GA = gestational age, GW = gestational weeks; H = hour(s); LBW = low birthweight, M = male, MO = month(s), NBW = normal birthweight, NS = not significant, PT = preterm, VLBW = very low birthweight, W = weeks, Y = year(s).