Ankyloglossia with Deviation of the Epiglottis and Larynx (ADEL)

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Abstract
History and definition of tongue-tie were previous to those of ankyloglossia. There after ankyloglossia accompanied by deviation of the epiglottis and larynx (ADEL), which hindered the growth of both maxillary and mandibular bones was site. It is next consideration that the cause of ADEL is an anatomical weakness of human beings was considered next. Diverse symptoms and signs of ADEL were reported. It was concluded that ADEL is an important problem in modern medicine.

General Remarks on Ankyloglossia
Today, ankyloglossia and tongue-tie are considered as the same concept. Tongue-tie is a condition in which the tip of the tongue and the lower gingiva are combined with the lingual frenum. The history of the word “tongue-tie” is very old. It goes back to the Chou Era (1066−256 BC) in Japan and in Europe goes back to Celsus (BC 25-AD 50) [1,2]. The majority of human babies could not suckle sufficiently at their mothers’ breasts. They suffocated frequently, vomited milk during suckling and suddenly withdrew from the breasts. They slept during suckling. They cried hard. These symptoms disappeared dramatically after the tip of the tongue was separated from the oral cavity [3,4]. The concept of the ankyloglossia was created by A Paré (1517-1590) in the Renaissance [5]. He modified the frenotomy devised by Paul d’Égine (625-690) to detach the tip of the tongue to the genioglossus (GG) muscle. After his modification the tip of the tongue has been separated from the base of the oral cavity by midwives to avoid ankyloglossia for all babies. The nail of little fingers of midwives was elongated for this procedure (Hieronymus (1537-1619), Theobald J (1764) [2-6]. All babies were considered to have been born with ankyloglossia. At that time those procedures were necessary for childcare.

Tongue-tie was included in the definition of ankyloglossia. It was written in a book for midwives that this intervention was necessary for all babies whether the frenum of the tongue exists or not [7]. We examined the lingual frenum at 4-month-old babies’ health checkups in Yokohama (1992, n=205) and at 5- and 6-year-old dental and oral health checkups in kindergartens in Kobe (2000, n=95) and in Odawara (2002, n=65). No frenum under the tongue was observed in 51%, 49% and 58% of children at these checkups, respectively, and the lingual frenum from the sublingual caruncle to the tongue was observed in 46%, 42% and 39% of the children at these checkups, respectively. Tongue-tie was only observed in 3%, 6% and 3%, respectively. Actually the rate of tongue-tie is very low in humans. Almost all babies are born with no or mild lingual frenulum as Baudelocque indicated in his book [8-10]. Since the Renaissance until the 20th century these procedures were done in Europe. The prosperity in Europe after the Renaissance might have greatly depended on this petit intervention.

From the early 20th century famous medical doctors began to oppose these surgeries [11]. In the textbook of Pediatrics (1996) [12], it is mentioned that a short lingual frenulum (tongue-tie) may be worrisome to parents but only rarely interferes with eating or speech, generally requiring no treatment. Ankyloglossia is confused with tongue-tie in modern medicine, and surgery for it is considered only for tongue-tie as “frenotomy”.

When I started in the field of otolaryngology in 1970, frenotomy was popular in the pediatric setting in Japan. The technique used was that developed by Paré. That is to cut the center of the frenum a little by an ophthalmologic scissors, then detach the tip of the tongue with a finger from the base of the oral cavity as far as the GG muscle. There was minimal bleeding by gentle detachment with a finger. This intervention resulted in an open wound, and could be skillfully done in several seconds. Just after the detachment of the tip of the tongue the babies’ faces turned pink and their colicky cries changed to clear and smooth sounds. Babies with previous sucking
difficulties could suckle well after the procedure, as cited in many reports about ankyloglossia [3,8,13-16]. The mothers said that their babies became easier to cuddle, which strengthened their love for the babies. Based on these observations, I realized that the tongue had a strong relationship with respiration.

I found that in babies with ankyloglossia the epiglottis and larynx were deviated upward and forward. I named this condition as ankyloglossia with deviation of the epiglottis and larynx (ADEL) [17]. After separation of the tip of the tongue from the base of the oral cavity those deviations were greatly ameliorated. Voice changes were reported to be clear after the division of the tip of the tongue at the same time unexpectedly corrected the deviation of the larynx. Observations by laryngoscopy showed that the deviation of the epiglottis and larynx did not straighten completely by simply separating the tip of the tongue using Paré’s technique alone. I added the cutting of several bundles of GG muscles to move the epiglottis and larynx downward after a multitude of simulations. The epiglottis and larynx stood straight towards the nasal choanae. The symptoms of ankyloglossia then disappeared amazingly. So, of the operated cases rose to 100%. This surgery was named “correction of glossolarynx (CGL).” Ameliorations by CGL were more satisfactory than those changes by frenotomy alone.

Respiratory Rate (RR), Vital Capacity (VC) and forced vital capacity in one second percent (FVC1.0%) increased after CGL. The hyoid bones moved ventrally and downward. Expansions of the hypopharynx were observed by X-ray studies of the neck cross-sectional CT scans. The changes made by CGL obviously revealed that the symptoms and signs of ankyloglossia mainly resulted from respiratory insufficiencies [18-23]. These observations mean that the GG muscle inhibited respiration. Human beings have this weakness. This defect might be caused by the posture of Homosapiens in that the foramen magnum is at the center of the base of skull because with the upright stance. And the larynx moves downward from the 4th to the foramen magnum is at the center of the base of skull because with the upright stance. And the larynx moves downward from the 4th to the 5th vertebrate of the neck [24-26].

Observed symptoms of ADEL in babies in addition to those cited above are as follows: “dark forehead”, “dark color around the lips”, “scanty eyebrows and eyelashes”, “retraction of orbitotemporal region”, “frowning expression”, “swelling around the palpebrae”, “hypertrophy of the cheeks” and “difficulty in making eye contact”. Their skin has been described as “cyanotic”, “cutis marmorata” and “pale lips and face”. They present with “persistent jaundice” “eczema” and “hypertrophy of the cheeks” and “difficulty in making eye contact”. Their sleep is shallow and they snore. Their features are pale and they are irritable and over-reliant. They lack in cooperation and are egotistical. They have no patience. They have a tendency toward mental retardation and ADHD.

In adulthood, they have malocclusions, misaligned teeth, high hard palates and deviations of the nasal septa. They cannot fully open the mouth and have underdeveloped jaws. They have feelings of nasal obstruction and deep wrinkles between their eyebrows. Lumbago is observed at a high rate when the epiglottis and larynx are deviated. Their legs tremble habitually when seated placidly. These habits might be caused from the habit of digit sucking during infancy. Most prominent complaints of adults with ADEL are sleep disorders such as insomnia, feeling of being sleepless, daytime somnolence, fatigability, headache, sleep apnea, snoring, bruxism and nightmares. The following symptoms are prominent in women: rough dry skin, tendency to feel cold, menoxenia, constipation and stiffness of shoulders. In addition, they are short tempered, selfish and dependent. They have a past history of conflicts against their parents. The greatest influence of ADEL is communication disorders. These symptoms and signs are successors of those from babyhood and childhood. Above all, they are the result of being incapable of healthy breastfeeding in their babyhood. Furthermore as seen with malocclusion, misaligned teeth, deviation of the nasal septa and nasal obstructions, ADEL inhibits development of both the maxillary and mandibular bones. I developed an operation that expanded nasal cavities by cutting vestibular septi nasis muscles from the maxillary bone between both canine teeth. It was named as ‘expansion of the vestibular oris (EVO)’. Nasal cavities expanded after EVO. EVO ameliorates sleep problems more than CGL. These observations show that the increase in the nasal cavities contributes to cooling of the brain. It changes the quality of sleep [28]. The greatest problem of ADEL is that it causes humans to be stress and it hinders communications. I emphasize that the resolution of ADEL is an important problem in modern medicine.

References

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