MICROSURGICAL REPAIR OF THE SOFT CLEFT PALATE

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ABSTRACT

A new microsurgical closure of the soft cleft palate was done in ten cases. The essence of the surgical procedure is summarized in three points; 1) a pancaked shaped musculomucosal flap of the soft palate and if necessary mucoperiosteal flap of the hard palate, 2) a whole layer Z-plasty at the palatopharyngeal muscle region, and 3) muscle sling of the levator veli palatini muscle. This surgical approach never exposes the retromolar region, which is a growth center, nor severes the lesser palatine nerve. Therefore, we expect a better growth of the maxillary and palatal bones, and less chance of anesthesia of the soft palate and of atrophy of the mucosal gland.

The push-back procedure by Wardill is a basic surgical technique of the cleft palate. Since then, Cronin, Millard and et al. have reported the refined techniques. Contrary to these static surgical procedures, Edgerton, Skoog and Randall have developed a concept of dynamic cleft palate surgery, a muscle sling of the levator veli palatini muscle. However, there are still some unphysiological and unsolved problems; an unavoidable severence of the lesser palatine neurovascular bundle in order to have a satisfactory retroposition of the palate, thus developing an atrophy of the uvula muscle and the mucosal gland, and anesthesia of the soft palate; leading possibly to an incompetent velopharyngeal closure; a severence of the tendon of the tensor veli palatini muscle or a fracture of the hamulus process in order to obtain an easy approximation of the cleft palate at the midline, and a possible interference of the normal bony apposition around the retromolar region, where is growth center, due to a scar tissue formation resulting from the para-alveolar and retromolar incisions during the push-back procedure.

In order to avoid such the problems, a new microsurgical approach has been innovated and will be reported in case of the soft cleft palate.
An incision is outlined along the junction of the normal and cleft oral mucosa in a U-shaped fashion along with a Z-plasty over the palatopharyngeal muscle just above the uvula, and the oral mucosal flap at the level of the posterior edge of the hard palate (Fig. 1). Under the operating microscope (5-6 × in magnification), the anterior half of the incision is cut only to the layer between the levator veli palatini muscle and the nasal mucosa, making a pancaked shaped flap (Fig. 2-a), and the posterior half of the incision in a full layer including the Z-plasty (usually a length of a Z-plasty is 5-7 mm at 60°) (Fig. 3).

Under the operating microscope, it is easy to separate the oral mucosa, the levator veli palatini muscle and the nasal mucosa into the three layers from the posterior edge of the palatal bones without any perforation of the nasal mucosa. The flap of the levator veli palatini muscle is only dissected out a two third in length from the cleft margin to the retromolar region (Fig. 2-b), and transposed into the normal anatomical place. By this maneuver, the lesser palatine nerves and the tendon of the tensor veli palatini muscle are never exposed into the surgical field, and the hamulus process is not fractured.

The nasal mucosa is approximated with 5-0 Dexon interrupted sutures, and special care should be taken when suturing the immediate portion of the hard palate, where is most delicate part on this operation and the flap has been already cut in the pancaked shape. Only thick pancaked portion of each flap is approximated by the suture under the operating microscope, and never insert the needle into the nasal mucosa itself in order to avoid the postoperative perforation. One side (5-10 mm long) of the oral mucosa at the most anterior part is shaved off and sutured. Then, the levator muscle flaps are brought together in the normal position and sutured into an overlapped position (Fig. 2-c and 4).

A lengthening procedure, contrary to the conventional static push-back surgery, is performed by a whole layer Z-plasty over the palatopharyngeal muscles. Hopefully, this tightening procedure will do a better velopharyngeal closure in an early postoperative days as well as even one year after surgery (by a muscle vector action, as observed in an early triangular method of the cleft lip repair). A Z-plasty is closed in the two layers. The nasal mucosa is approximated with 5-0 Dexon and the oral mucosa with 5-0 black braided silk interrupted sutures except for the layer over the levator veli palatini muscle, where 4-0 black braided silk sutures are used (Fig. 5, 6).

Postoperative care is no different from usual. A raw surface posterior to the palatal bones on the oral mucosa (nasal side in case of the conventional push-back procedure) is epithelialized within the several days without developing
fistula (Fig. 7).

RESULTS

Ten cases of the soft cleft palate have been operated under the operating microscope without complications. Speech evaluation has been under the study and a typical case at three months postoperative check-up shows a clear articulation without the nasal escape. However, its details will be reported in a later day. No anesthesia of the soft palate is noted. A similar technique has been also done in the complete cleft palate with a satisfactory result, which will also be reported later.

DISCUSSION

Recently advancement in the field of microsurgery is great. However, some authorities still refuse to accept and acknowledge such a new surgical technique, simply because the conventional technique one accustoms to does a daily job without any difficulty. This remark reminds me what Nagata described about the day when microsurgery first adapted in ophthalmology in Japan in late 1960. Ten years past from that time and now, everyone of them are so easily in practice of microsurgery that this new technique has even approved by the social insurance in Japan.

Same thing will be talked about the cleft palate repair. I have been in practice for cleft palate repair by Wardill technique for the past 20 years without any difficulty, and with some contentment. Adapting the microdissection technique, I was rather surprised to observe the fine fibers and atypical course of the levator veli palatini muscle under the operating microscope. This is what I never experienced under the naked eye operation. The new technique, in addition, gives us an easy detachment of the levator veli palatini muscle from the hard palate without perforating the nasal mucosa, although Randall described that this part of dissection is most difficult one.

A Z-plasty of the nasal mucosa has been described but a whole layer Z-plasty of the palatopharyngeal region is a new technique. This concept is based on the fact that cleft lip repair by triangular method will do an elongation of vertical length at least one year after surgery. Both cleft lip and palate have free margin and anatomically somewhat resemble each other. Therefore, the same concept would be applied and a whole layer Z-plasty was utilized near the free margin of the cleft palate. Recently, I feel that more tightening procedure by Z-plasty should be done, because tongue blade of mouth gag counteracts to narrow the
velopharyngeal closure during surgery.

The exposed levator muscle is covered by the oral mucosal flap. The flap is somewhat simulated to Perko's flap\textsuperscript{10} but I never detach the nasal mucosa from the hard palate.

A pancaked shaped flap should be more bulky from the hard palatal margin to the levator veli palatini muscle, where is most difficult part to approximate the flaps at the midline. Making the pancaked shaped flap in the hard palate, it is important to pay an attention for bleeding from the cut end of the lateral side of the hard palate, because of its nearness to the great palatine neurovascular territories. Electrocoagulation does a job with satisfaction.

A levator sling is not a new technique but it is important to have a good adaptation of the muscle at the midline, especially in order to avoid a submucous cleft effect.

REFERENCES

Fig. 1 Design of the microsurgical palatoplasty. A pancaked shaped flap of the anterior portion of the cleft, and a whole layer Z-plasty of the posterior portion of the cleft with a side out of the oral mucosa at the level of the posterior edge of the hard palate.

Fig. 3 The anterior portion of the cleft palate is dissected into a pancaked fashion and the posterior portion into a whole layer Z-plasty.
Fig. 2  I. A design of the total incision. Sectional cut at A-B. II. The oral mucosa flap is elevated and the levator veli palatini muscle is detached from the posterior nasal spine and separated from the oral and nasal mucosal layers, and then transposed into the normal anatomical position. Sectional cut at A-B. III. After an overlapped suturing of the levator muscle (Levator sling), and a total suturing.
Fig. 4 The levator veli palatini muscle is separated from the oral and nasal mucosa under the operating microscope without difficulty and sutured into a normal and overlapped position.

Fig. 5 Suturing of the cleft palate.
Fig. 6 Close-up view of the soft and hard palate junction. Note a raw surface of the oral mucosal side.

Fig. 7 One month postoperative finding.