THERAPY

Early results and experience with Furlow double opposing Z-plasty

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Abstract

Since the establishment of the Cleft Centre in Bratislava efforts have been made to introduce new progressive operative techniques intended to improve both functional and aesthetical results of the procedures. As a consequence of these efforts the Langenbeck and Veau techniques used for ten years were in the 70-ties replaced with the Wardill–Kilner technique based on the "push-back" principle. The most recent trend in the palate repair is the Furlow double opposing Z-plasty used since 2002.
The article is focused on the early results and experience with the Furlow palatoplasty. ***(Fig. 6, Ref. 18.)***
Key words: cleft lip and palate, palate repair, palatoplasty, double opposing Z-plasty, velopharyngeal competence.

In 1976 Leonard T. Furlow, Jr., MD., a clinical professor at The University of Florida College of Medicine in Gainesville, U.S.A. developed a new technique for cleft palate repair the "Double Opposing Z-plasty". Frustrated with the functional results of Von Langenbeck palatoplasties (velopharyngeal competence rate about 48%), performed before 1976 in 45 patients, he decided to change the technique for cleft palate repair.

The Furlow technique of palatoplasty by double opposing Z-plasty is based on the hard palate closure in one procedure without push-back and closure of soft palate with mirror image Z-plasty which allows a reposition and an overlap of the palatal muscles to form a palatal muscle sling.

Is a popular method for cleft palate repair thank to numerous advantages of the technique.

Material and methods

Clinical data available shows that over the past 50 years about 4127 patients with lip or palate cleft were treated in the Bratislava cleft centre. Throughout the existence of our cleft centre efforts were made to introduce new progressive operative techniques with the intention to improve both aesthetic and functional results. As a consequence of these efforts the Langenbeck and Veau techniques used for ten years were in the 70-ties replaced with the Wardill–Kilner technique based on the "push-back" principle (Wardill, 1937; Kilner, 1937).

The most recent trend in the palate repair is the Furlow double opposing Z-plasty used since 2002. Because of the very short time of the follow-up (2 years) the technique can be evaluated only with some limitations.

Twelve patients who underwent surgery in the cleft centre in Bratislava (5) and on an oversea mission in South America (7) were in follow-up 1 to 17 months after the surgery. From the all patients 2 had unilateral cleft lip and 10 had cleft palate only. The age ranged from 6 months up to 17 years.

The principle of the technique is an elevation of the 2 posteriorly-based flaps with palatal muscle. The nasal Z-plasty is the mirror image of the oral Z-plasty. The Z-plasties may be orientated either way, and also the surgical algorithm can be modified. As a right-handed surgeon I use the orientation and the algorithm shown and described (Fig. 1).

After local infiltration of mesocaine and adrenaline solutions the first incision is precisely made along the left margin of the cleft. The left lateral limb incision ends at the hamalus. The palatal aponeurosis must be completely divided, freeing the flap to rotate. The tip of the flap is elevated with palate muscle and carefully separated from the nasal mucosa (Fig. 2). Afterwards the

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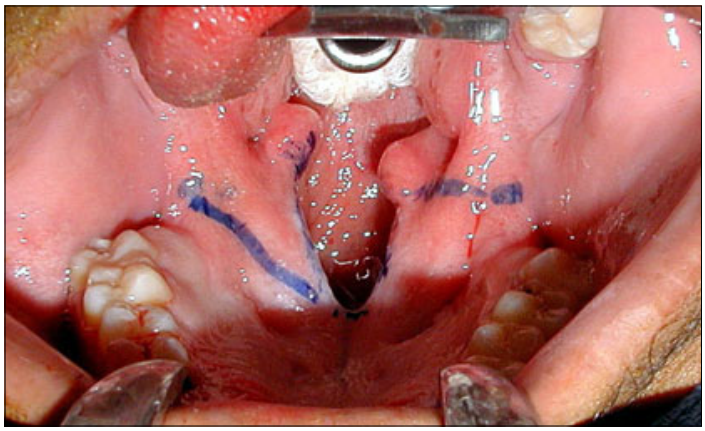


Fig. 1 + scheme. Preoperative planning of the incisions.

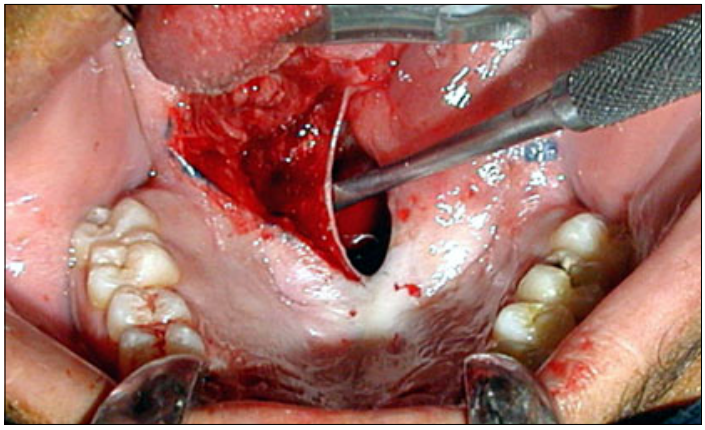
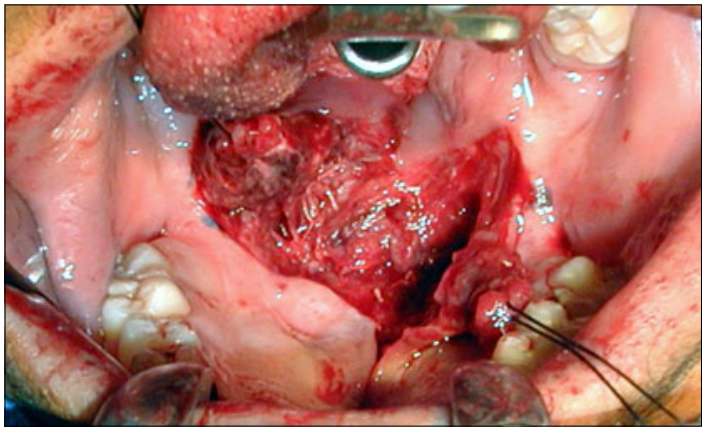


Fig. 2 + scheme. Separated nasal mucosa after an elevation of the left myomucosal flap.



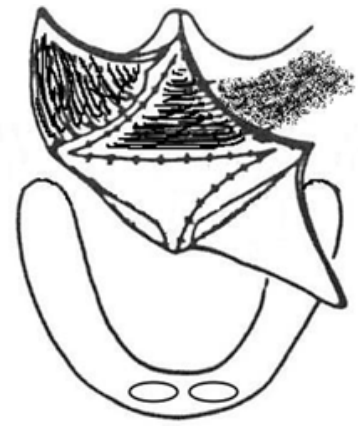


Fig. 3 + scheme. Nasal layer completed.

nasal mucosal flap is incised from just in front of the uvula to the Eustachian orifice. In case of complete cleft lip and palate the left mucoperiosteal flap on the hard palate is elevated and nasal mucosa is dissected.

On the right side the cleft margin is incised. Right lateral limb incision starts in front of the uvula and ends at the hamulus. Only the oral mucosa is elevated and separated from the palatal muscle. After the muscle insertion from the back of the hard palate is detached, the incision of the nasal myomucosal flap is aimed at the Eustachian orifice. Similarly, in case of complete cleft lip and palate the right mucoperiosteal flap on the hard palate is elevated and nasal mucosa or vomeral flap is dissected.

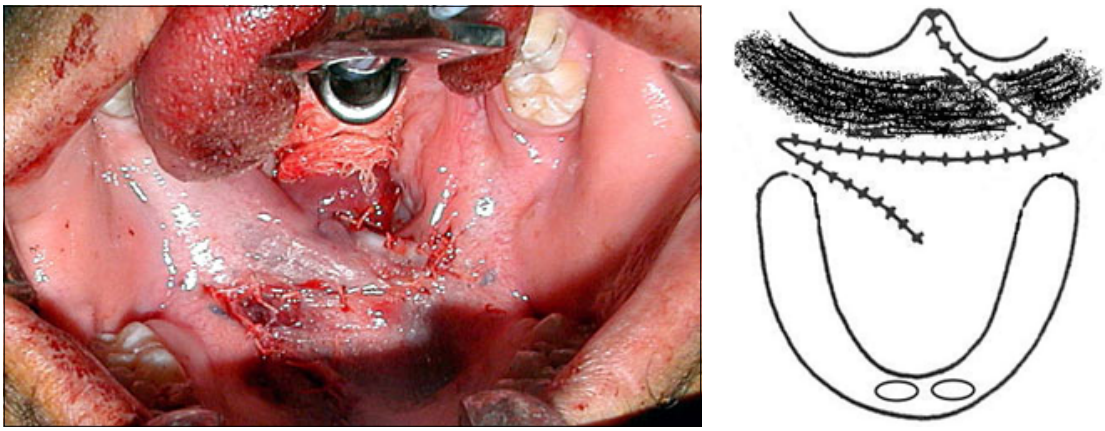


Fig. 4 + scheme. Oral layer completed.

Fig. 5, 6. Preoperative and postoperative view.

The tip of the right posteriorly-based myomucosal flap is sutured with Vicryl 4,0 into the apex of the left lateral limb incision. Equally, the left mucosal flap is sutured into the apex of the right lateral limb incision (Schema + Fig.3). If necessary, the vomer flap is used for the nasal layer closure of the hard palate. Using Vicryl 4,0 suture the left oral myomucosal flap is sutured at the level of the right hamulus, so the palatal muscles can be overlapped. The right mucosal flap is then inserted (Fig. 4). The hard palate closure is completed by bringing the mucoperiosteal flaps horizontally and suturing them with mattress sutures.

Results

There was no evidence of early postoperative complications (e.g. dehiscence, fistula etc.), in one case (wide syndromologic cleft with hypoplastic hard palate and mucoperiosteum) the hard palate was sutured only in one layer using vomeral flap.

Comparing with the Wardill–Kilner technique significantly reduced incidence of postoperative bleeding was observed, that is logical, because using this technique there is no unsutured area on the palate left. No patient required transfusion, no immediate reoperation was necessary.

Discussion

Double opposing Z-plasty is a single stage palatoplasty which respects the hard and soft palate separately. The soft palate is closed by a Z-plasty of the oral side and a mirror image Z-plasty of the nasal side. That in the fact results in the lengthening of the soft palate by the geometry of the Z-plasty, without any additional movement of the tissue from the hard palate. Hard palate can be closed by bringing the mucoperiosteal flaps horizontally without push-back and usually without lateral incisions. The mucoperiosteum is undermined only in the case of wide cleft gap when lateral relaxing incisions are performed.

In my opinion, this is the reason why the techniques based on the mucoperiosteal flaps push-back (e.g. Wardill–Kilner) have a higher tendency for fibrotization and scarring, which can result in maxillary growth disbalances, eventually.

There is no doubt that the Furlow double opposing Z-plasty results in anatomic changes that are necessary for speech and velopharyngeal function. Significant increase in velar length and velar thickness, which are important in postoperative velopharyngeal competency achievement, were demonstrated by radiographic and aerodynamic measurements (D'Antonio, 2000). Several retrospective studies have already documented a positive speech outcome for patients who underwent Furlow Z-plasty as a primary operation (Spauen, 1992; Mc Williams, 1996). Additional studies have documented the importance of the Furlow technique in the velopharyngeal insufficiency management (Chen, 1994).

However our existing postoperative results of Furlow palatoplasty are promissing, longer follow-up is necessary for serious cephalometric and speech evaluation (Figs 5, 6).

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