# The combination of Furlow's double reversing Z-palatoplasty and von Langenbeck technique for the management of secondary complete cleft palate

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### **ABSTRACT**

To report the case with complete secondary cleft palate who was treated successfully in one stage with a combination of Furlow's double-reversing Z-plasty technique and modified von Langenbeck method. Secondary cleft palate was completely treated with the combination of Furlow's doublereversing Z-palatoplasty and modified von Langenbeck method in an adolescent male patient and also surgical stent was used postoperatively for 2 weeks. As a result, we believe that a combination of these techniques was useful and successful method to treat wide unilateral or bilateral cleft palate in one stage.

Key words: Cleft palate, Furlow's Z-palatoplasty, Modified von Langenbeck technique, Secondary complete cleft palate



#### INTRODUCTION

reatment of cleft lip and palate patients with the various surgical techniques and orthodontic methods has been reported in the literature. In these studies, the effect of different surgical techniques and orthodontic treatments was searched on muscles of levator veli palatini and longus capitis, early and late surgical methods, speech and hearing impairments, palatal function, velopharyngeal deficiencies, dentofacial development, and residual fistulas.<sup>[1-9]</sup>

The superiority of Furlow's Z-plasty technique was reported in many studies that investigated the effect of treatment methods on speech, velopharyngeal valve insufficiency, and velopharyngeal.[2-7,10,11]

#### CASE REPORT

An adolescence male patient was referred to our clinic

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with complaints of speech and eating disorders. In his medical history, he had a cleft lip operation [Figure 1], with a satisfactory result in a different medical center, but cleft palate operation was failed in childhood period [Figures 2 and 3]. After the clinical and radiological evaluation of complete cleft palate, the combination of modified von Langenbeck and Furlow's double reversing Z-plasty was planned to closure the defect [Figure 4] and also, a surgical stent was prepared preoperatively

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Figure 1: Patient view in childhood



Figure 3: Preoperative facial view

[Figure 5]. The patient was operated under general anesthesia. To perform a complete closure in the soft and hard palate region without tension, bilateral incisions (from mucosa to the bone) were made along to tooth axis [Figure 4]. To support these incisions additional triangle incisions (mucosa down to the muscle) were performed in the posterior direction. Moreover, incisions were made along the sides of the cleft palate to obtain loosened mucoperiosteal flap in the nasal direction. The bilateral incision was performed for uvula reconstruction in the posterior border of the defect.

We performed two Z-plasties (four in total) along the oral and nasal directions to provide triangle flaps in reverse directions, [Figure 4: Musculo-mucosal flaps were remarked as number 2, 3 and mucosal flaps were remarked as number 1, 4].

Then, mucoperiosteal tunnels were formed bilaterally by mucoperiosteal entrance into both palatal incision regions, and these tunnels were reached incision lines along the sides of the hard palatal cleft.



Figure 2: Preoperative intraoral view



Figure 4: Intraoperative using flaps

During these flaps preparation, it was a very important point to not ruptured mucoperiosteal flaps. Loosened flaps (along the hard palate and cleft edges) were closed without tension using absorbable 4/0 suture in nasal direction.

Following the loosened mucoperiosteal and doublereversing Z-plasties, to closure the soft palate cleft, mucosal and musculo-mucosal fleps were, respectively, slided against each other and were closed primarily using absorbable 4/0 suture [Figure 6]. Then, anterior part of the hard palate cleft was closed with the help of loosened mucoperiosteal flaps [Figure 6]. Therefore, the whole cleft was closed without tension using the combination of modified von Langenbeck incision and double reversing Z-palatoplasty.

Then, the surgical stent, which was prepared before the operation, was applied to maxilla without pressure for 2 weeks. By using this stent, the operation region was isolated from the mouth environment in the postoperative period and therefore the region was prevented from



Figure 5: Preoperatively prepared surgical stent

infection and dehiscence. The stent was removed after 2 weeks of postoperative medical treatment. Secondary palatal healing zone and cleft region were recovered without complications, and there was no oro-nasal fistula in the healing zone [Figures 2 and 7]. It was also observed that the patient had no complaints during the postoperative follows up.

#### DISCUSSION

There are multitudes of cleft palate repair techniques used by different cleft surgeons throughout the world. Currently, there is no consensus regarding the best technique to be used for a particular type of cleft. A major reason for this lack of consensus is an absence of randomized clinical trials and long-term outcome studies comparing different techniques of cleft palate repairs.<sup>[10]</sup>

There are two important ways of assessing the success of palatal repair: The quality of speech and the incidence of oro-nasal fistula. Several authors determined the incidence of oro-nasal fistulas after palatal repair varies from 3.4% to 23% of patients in their study.<sup>[11,12]</sup>

Furlow's technique has been modified for use in the two-stage closure of complete cleft palates (with or without cleft lip or alveolus) with an acceptable rate of complications.<sup>[13]</sup>

In the literature, it has been reported that Furlow's technique has better results in hypernasality and speech scores, and this technique reduces the necessity for the pharyngeal flap.<sup>[4]</sup> Spataru and Mark<sup>[7]</sup> have reported that even though they preferred Furlow's technique, the results were very similar with Wardill–Kilner technique.

Many authors<sup>[1,5,6,14-16]</sup> have stated that Furlow's palatoplasty is a useful technique to remove the velopharyngeal failure.



Figure 6: Closure of the cleft

Moreover, they also reported that this technique reduces the velopharyngeal gap and responds better to biofeedback therapy, and this is why the choose this technique. Hwang<sup>[3]</sup> also reported that Furlow's Z-plasty technique provides the best speaking ability.

Sender and Sykes<sup>[2]</sup> compared the modified Furlow's technique with classical palatoplasty techniques and observed that in Furlow's technique the operation time is longer, and the patient has more loss of blood; however, in the end, this technique improves the palatal function.

In the cleft surgery, some researchers<sup>[4]</sup> reported that using pharyngeal flap the effect of and some of them<sup>[11,12]</sup> also reported using iliac and cranial bone grafts, and application of expanded polytetrafluoroethylene membranes with autogenous cancellous iliac bone.<sup>[13]</sup> La Rossa *et al.*<sup>[11]</sup> reported that iliac bone grafts are better than cranial bones in cleft palate surgery but have the same results in alveolar grafts. Takato *et al.*<sup>[12]</sup> reported that cantilever iliac bone graft can be used successfully in providing nasal appearance and profile in combination with open rhinoplasty techniques subperiosteally.

Moreover, it was reported that orthognathic surgery has successful results in closing the gaps in residual fistulas and the dental gaps in cleft regions.<sup>[8]</sup> Posnick and Tompson<sup>[8]</sup> reported a successful closing rate of 89% in residual fistulas in adolescent patients that have isolated unilateral and bilateral lip-palate clefts and reported a successful closing rate of 92% in treating the dental gaps. They also reported that there were no significant complications observed in these patients.

Yamawaki et al.<sup>[9]</sup> have firstly reported that effect of levator veli palatini and longus capitis muscle on the phonation and velopharyngeal valve in the patients with velopharyngeal failure.



Figure 7: Postoperative view of adolescence male patient with complete cleft palate

Some researchers<sup>[17]</sup> reported that complications such as postoperative partial air flow obstruction and small dehiscence during the 2 staged treatment of cleft palate using Furlow's Z-plasty.

In our case, during the postoperative period there was no dehiscence or oronasal fistula observed and thus, no secondary palatoplasty was required. In our opinion, this successful result depends on a combination of Furlow's double reversing Z-palatoplasty and modified von Langenbeck techniques with the surgical stent that isolated the operation region from the oral cavity.

As a result, we conclude that the combination of these techniques is a successful method in closing the wide unilateral or bilateral cleft palates in only one stage.

#### **Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/ their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### **Conflicts of interest**

There are no conflicts of interest among authors.

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