**Prosthetic treatment of VP function**

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**Cleft lip and palate is a common congenial deformity. It affects speech and life quality of the patients. There still are disorders of speech in many patients after operation. The velopharyngeal incompetence is the main reason. The paper is written to discuss about prothesis treatment of VP function.**

**Speech of Pathology of cleft palate**

In speech process, the airflow that passes the glottis, and the vocal tract results in the acoustic output. To pronounce correctly, enough air pressure is required in the oral cavity. And the complete velopharygneal closure is the prerequisite for pronunciation. But velopharyngeal incompetence still exits in 1/3 of children with cleft palate after operation.

**Articulation of cleft palate has four characteristics**

**1.hypernasalty: Under velopherangeal incompetence, a lot of air goes into nose, and causes a resonance in oral cavity and nasal cavity spontaneously.**

**2.nasal emission**
**3.decrease of oral cavity pressure**
**4.compensative articulation. To evaluate and treat the palatalized phonation.**
**Clinician should make a treatment plan to confront these four aspects.**

**VPI**
**After operation, about 60% of child with cleft palate achieves complete closure of VP. With speech training and behavioral therapy, it is possible that the VP function of the patients post-operatively can develop to normal.**

But about 40% patient still has VPI. Many factors may cause VPI, for example congenital defect of anatomy and function in palate muscles, technique and method of surgery, etc. many methods may treat VPI. The focus is about using prothetic treatment of VP function in the paper.

Temporary speech prothesis

1. Principle

Temporary speech prothesis is one of good appliance for VPI, especially for patients who want not to do the second operation or before the second operation.

A temporary obturator is an acrylic prothesis, with a small bulb on its end, and it contributes the most of role to patient. The bulb is located at the center of hole of VP. It can block the airflow tract between oral cavity and nasal cavity so as to achieve temporary closure of VP. At the same time the bulb may stimulate surrounding muscles. So these muscles become more and more stronger.

**The temporary VP closure is a prerequisite of stopping compensatory articulation and speech therapy. When patient is speaking, the periphery of bulb will be attached to the moving VP wall and lifting of soft palate spontaneously in order to fulfill the hole of VPI. When patient is quieting, air may go through the leak between the bulb and pharyngeal wall, which can insure the normal nasal breathing and avoid hyponasalty.**

**As the speech is normal or approximately normal, the bulb is to be reduced in size, step by step, so that it can further stimulate pharyngeal muscles and improve the compensatory of VP function. Generally, the patients should be checked every 3~4 months interval. And the bulb should to be reduced according to the result of exam of nasopharyngoscope. When it is determined that VPI will not occur without obturator, complete compensation of VP muscles is established because it sets up good circumstances for correct articulation.**

## Structure of appliance

## This appliance involves the following three parts

**1. Anterior part:**
**an acrylic thin plate which attaches hard palate.**

**2. Middle part:**
**Connecting rod, which links the anterior part and the posterior part.**

**3. Posterior part:**
**Bulb made from acrylic resin. When the appliance is worn into oral cavity, the bulb is located at the center of VP hole.**

**Manufacturing methods**

**1. Get occlusion model of maxillar**
**2. design: to design circumferential clasp attached to 76\| 67 or V IV\|IV V. Some children need a more clasp.**

**3. Make palate plate:**
**It is similar to the method of making denture of acrylic resin. And try to wear it about 1~2 weeks.**

**4. To make a connecting rod: the rod is made of 0.9mm two sticks of wires. The length is from posterior margin of palate to uvula.**

**5. According to nasopharyngo-scope pictures of the shape and size of VP hole, to make the bulb, clinician may add more acrylic the bulb little by little to fit the VP hole.**

**When the obturator is large enough, the air leak accompanying sound in the nose will notably decrease or stop. It should not affect patient's breathing or cause other uncomfortable.**

**Points for attention**

**Be sure that patients feel comfortable with no nausea when they wear it and that the appliance will do no harm to patients' health and development. Be sure that the patients can cooperate with the clinicians.**

1. No nausea or opposition from patient when clinician makes the occlusion model of maxillar.

2. Be sure that the connection bar tightly attached to soft palate and elevates soft palate 1mm.

3. Good fixation.
4. The palate plate should be thin especially at the incisor area because 85% of consonants occur in this area.
5. If patient feel uncomfortable or hurtful, he (or she) must go to see a doctor or a dentist, when wearing obturator.

**Directions of using obturator**

**1. Patients wear it into oral cavity at daytime and take it off and put it in water at night, which can maintain the original shape.**

**2. Patients have to go back to hospital every 3~4 months. The doctor will assess VP function and modify the bulb with nasopharyngoscope.**

**3. As the patients achieve normal voice quality and proceeds with proper articulation, the clinician should pay attention to the changes after using it about 6 months. If the speech becomes normal, it usually indicates that there should be a treatment break at weekend, even for one month. If speech disorders still appear, patients should wear it again.**

4. To prevent caries and bad hygiene, parents should help children keep the obturator clean under the directions.

5. Many patients referred for consistent application apparently have adequate potential for appropriate VP function if children (parents) and clinicians cooperate closely.

Assessment

1. After obtaining temporary closure of VP with this appliance, patient should go to see a speech pathologist timely to correct the articulation.

2. According to nasopharyngo-scope examination, bulb are usually reduced in size every 3~4 months.

3. Obturators are usually worn ,and reduced ,over 1 to 3 years. When it is determined that an obturator cannot be reduced any further and cannot be successful removed, the patient is referred for a surgical substitute so that the temporary speech appliance can be discarded.

4. Through clinic practice, we found that children seem to have a better adaptation and prognosis than adults'. But clinician should understand that children who are not co-operative well need more patience.

**Study of and experience with temporary obturator for 8 years at the affiliated hospital of Qingdao university has indicated that obturator can be reduced considerably in size and even successfully removal without subsequent surgery.**

**During one extended time period, 40% the patients wearing obturator had the bulb reduced to the point of successful removal without altering their oral-nasal resonance. The number of patients wearing temporary obturator in the affiliated hospital of Qingdao university is about 200 .**