"Glossopharyngeal Breathing" by Paralyzed Patients

A Preliminary Report

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SUMMARY

Several patients with poliomyelitic paralysis of the muscles used in normal breathing learned a method of breathing consisting of pumping air into the lungs by action of the mouth, cheeks, tongue, pharynx and larynx.

The advantages of the method are that the patient can be out of the respirator and on a conventional bed for longer periods, can talk longer and louder, is more easily cared for, and is better able to engage in interesting occupations.

AN unusual kind of respiratory action is practiced by several patients at Rancho Los Amigos who have pronounced poliomyelitic impairment of the respiratory muscles and who, except by this kind of breathing, have a very low vital capacity and limited ability to breathe without artificial means.

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Very similar to the lung breathing used by most amphibia including frogs and toads, it consists of trapping a small amount of air in the mouth and throat and then forcing it through the larynx by action of the tongue and pharynx and sometimes of the cheeks. The air is then held in the lungs by closure of the larynx while the mouth and pharynx are again filled with air, which again is forced into the lungs. This is repeated about a dozen times until the lungs are quite filled. The air in the lungs is then emptied, usually through the partly closed lips. This is repeated continuously with a respiratory rate of about six per minute. The terms "glossopharyngeal breathing" and "frog breathing" seem to be quite appropriate for brief description.

Several of the patients discovered this method of breathing without help or even suggestion that it was possible. Others learned from them. Several of the patients who breathe in this manner are able now to be out of the respirator for several hours.

TABLE 1.—*Data on Glossopharyngeal Breathing (15 Patients)*

Patient No.	Age, Sex	Onset of Paralysis	Date GPB* Started	Approximate Vital Capacity: Without GPB	Approximate Vital Capacity: With GPB	Time Out of Respirator (As of June 1, 1950): Without GPB	Time Out of Respirator (As of June 1, 1950): With GPB	Remarks
1	29M	5-9-44	About '46	150	600	Not known	All day	Died 1-30-49
2	25F	8-10-49	10-12-50	100	1,000	25 min.	2 hrs.	
3	37F	6-25-48	9-21-50	200	815	25 min.	2 hrs.	
4	29F	10-24-49	10-12-50	200	1,710	2 min.	3 hrs.	
5	28M	11-10-48	9-13-50	100	1,150	2 min.	1 hr.	
6	29M	11-7-50	2-15-50	10±	1,200	Not out	1½ min.	
7	21M	8-7-49	1950	1,500	2,700	†		
8	17M	10-10-48	April '49	500	1,500	†		
9	20M	8-29-48	May '50	600	1,600	†		Practicing only.
10	39F	11-15-48	9-22-50	100	300	1 min.	1 min.	Not yet learned.
11	24M	9-3-50	2-13-50	200	.....	1 min.	1 min.	
12	44M	10-10-49	10-27-50	0	.....	1 min.	1 min.	
13	24F	5-29-50	11-14-50	150	.....	1 min.	1 min.	
14	25M	9-17-48	10-3-50	0	.....	1 min.	1 min.	
15	47F	8-2-48	May '51	500	900	All day	.....	Does most of breathing with neck muscles

*GPB=Glossopharyngeal breathing.
†Did not need to resort to glossopharyngeal breathing.

Additional comment: It is noteworthy that Patient No. 6 has very low vital capacity. Patients 7, 8 and 9 are able to "frog-breathe" successfully but do not need to. Patients 8 and 9 stated that at one time they were able to talk more loudly when they were using "frog breathing" than they could otherwise. Patients 10 to 14 had not learned the technique at the time of this report, although all had been practicing for some time. Patient No. 1, although he died, probably from chronic anoxia, mastered the technique of "frog breathing" and was able to remain out of the respirator during the daytime. Patient No. 15 does not need it for breathing unless it might be used as an alternative, since she breathes mostly with accessory muscles in the neck.

They can be placed on a regular bed, which facilitates nursing care, physical therapy and occupation, and improves their morale. They are able to talk much louder and longer on one breath, and they are better able to cough up mucus.

Nine ventilation measurements were done on four adult patients (Patients 2 to 5, Table 1) who used this form of breathing. The average amount of air forced into the lungs at each pumping action of the tongue and mouth was 58.7 cc. The average volume of a single breath was 713 cc. The average number of breaths per minute was 6.1 and the average volume of ventilation per minute was 3,761 cc.

This volume of ventilation was low in comparison with the average volume of 6,848 cc. per minute produced for these patients by the respirator operating at the rate and capacity to which the patients were accustomed (average tidal air of 428 cc. and average rate of 16 per minute). Some of the difference in volume—possibly 1,000 cc. of it—may be offset by the better quality of the air breathed by the glossopharyngeal method, since there is less rebreathing of air in the dead air space with deep slow breathing than with shallow rapid breathing. It is possible also that there is better absorption of oxygen because of positive intrapulmonary pressure achieved in glossopharyngeal breathing.

Attempts at instruction have been almost entirely from patient to patient. Since many patients could receive great benefit, better means of instruction should be developed.

Adequate strength of the participating muscles, those of the larynx, pharynx, soft palate, tongue and cheeks and mouth, is of course necessary. Care should be taken that this method of breathing is not overdone in the presence of inadequacy. There should be no undue fatigue which may lead to anoxia. To permit time for practice, artificial respiration should be stopped several times daily, for not more than a minute at a time at first but for gradually extended periods as the patient improves in technique. The volume of ventilation per minute should be measured before the patient is able to breathe more than about ten minutes.

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