

Determination of Muscles of Head Acting in Whistling

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Abstract

Background: Whistling without using a whistle or fingers considered as a manly skill in our patriarchal society is taught as a means of testing for integrity of facial muscles and Facial nerve for UG students in MBBS under clinical examination of VII cranial nerve. But this test has been mentioned only in a very few books of clinical examination. This fact raised the need for this study

Aims and Objectives: To determine percentage of population who can whistle, muscles of head involved in whistling & gender variation

Study Design: A descriptive, cross sectional study by convenient sampling method conducted among 200 UG MBBS students of age group 18 – 25 of GTMC.

Results: 80% of participants were able to whistle; Whistling is not a manly skill. An element of social inhibition is there in women to whistle; 90.5% of subjects used muscles innervated by both Facial nerve and Hypoglossal nerves simultaneously.

Conclusion: There is subtle knowledge gap between clinicians and non - clinicians probably due to lack of need to update for the later which will become evident to students when they enter clinical side. Hence we, teachers too need to refer clinical subject text books and clinical examination manuals to accept, ignore and criticise as appropriate.

Keywords: Whistling; Facial nerve; Hypoglossal nerve; blow air test

Introduction

Whistling is generally considered a manly skill in many communities of our society which are basically patriarchal. It is a complex skill that requires observation and integration of CNS, Peripheral Nervous System, muscles of Expiration, Vocal cord & Head to perform. Whistling without using a whistle or fingers is one of the tests being taught to under graduate MBBS students to assess Facial nerve functions. Out of five practical Physiology books one book¹ does not mention whistling

as a test, one² says buccinators is partly responsible with Orbicularis Oculi and others^{3,4,5} have included whistling as a test for buccinators; Whereas in staunch contrast, only two^{13,14} of ten books of Clinical Examination have mentioned whistling as a test for Facial nerve. One Clinical Medicine book states that action of buccinators is helpful in playing wind instruments & in whistling as do two of Anatomy books^{14, 15} directly and one¹⁶ indirectly. Therefore it is assumed that though the Buccinators help in whistling it is not the sole muscle for this action. Hence this study was designed to determine % of population who can whistle, muscles of head involved in whistling and to know whether there is any gender variation in the ability to whistle.

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Materials & Method

A pilot study was conducted in 10 of our faculty

who were unaware of the aim of the study. They were requested to whistle without using fingers or a whistle, carefully observe what happen in head during whistling and report. . The actions they reported were

Retraction of cheeks

Spouting of Lips

Protrusion & Folding of tongue – in U shape

Out of 10 one said she could not whistle at all even after repeated attempts and one blushed and said this is my first attempt and let me see whether I succeed. Based on their report a form to collect data was designed as follows

Table 1: Form for Data Collection

S. No	Sex	Knows Y/N	If does not know		Pursing / Protrusion of lips		Retraction of Cheeks		Folding of Tongue	
			Failed	Succeeded	Yes	No	Yes	No	Yes	No

Institutional ethical committee clearance was obtained; the students were explained of the aim of the study and of the fact how much significance their cooperation in the form of giving honest answers carries in their vernacular language; a written consent was obtained after explaining what they have to do, note and report from those who were willing to participate.

Exclusion Criteria: Persons who are suffering from Bell’s Palsy, Tongue Tie, Cleft Lip & Palate, Painful mouth conditions such as infected Caries Tooth, Wisdom tooth eruption, Gingivitis, Respiratory and Cardiac Illnesses, CNS disorders, Chest Injury, Costo Chondritis, Residual Poliomyelitis, Kypho – scoliosis & Vocal Cord Lesions

Screening Procedure: General Examination,

Examination of CVS, RS & CNS

Study Procedure:

Participants were requested to whistle without using fingers. Each participant was also observed by a researcher when the subject whistled. Those who knew and who succeeded were enquired on what actions took place. During the study students reported additional actions too. Hence the form to collect data was modified with a column for any additional action. On analysis it was found that all actions involved muscles innervated by Facial and Hypoglossal nerve only. In order to simplify, the format was further modified grouping all the actions of muscles innervated by Facial nerve and all the actions of muscles innervated by Hypoglossal nerve into one column for each and analysed.

Table 2: Modified Form

S. No	Sex	Knows Y/N	If does not know		Protrusion of lips/ Retraction/ Blowing out and retraction of cheeks alternatively	Folding in U Shape / Pushing the tongue to place it behind lower teeth / Folding tip to touch floor and curving lateral edge down
			Failed	succeeded		

Statistical Analysis: Data was analysed and expressed in terms of percentage.

Table 3: Consolidated & Analysed Data

Sex	No of participants	Whistled		1 st attempt		Used muscles innervated by Facial Nerve		Used muscles innervated by Hypoglossal Nerve	
		No	%	No	%	No	%	No	%
Female	112	85	76	47	42	83	97.6	71	83.5
Male	88	75	85	18	20.5	75	100	72	96
Total	200	160	80	65	32.5	158	98.8	143	90.5

*Two persons whistled by using only tongue.

80% of participants were able to whistle.

Muscles innervated by both nerves were used simultaneously by 90.5%. Two subjects were able to whistle using tongue alone.

Gender variation in the ability to whistle is insignificant

Females attempting to whistle for the first time were > 200 % to that of males

Discussion

Buccinator compresses or retracts cheeks against teeth and thus helps to blow out air from mouth. It compresses blown out cheek and raises intra oral pressure^{13, 14, 15,18,19,20} an activity important in whistling as well as when playing wind instruments accounting for the name of the muscle (In Latin Buccinator means Trumpeter). Orbicularis Oris by protruding lips forms a slit through which forcibly exhaled air escapes¹⁸.

Action of tongue in whistling is variable. Those who fold the tongue in U shape turning the apex and sides upwards to make the dorsum concave and slightly elongate by narrowing, depress & push the tongue to place it behind lower teeth use the intrinsic muscles - Superior Longitudinal & Transverse and Post fibers of Genioglossus, Hyoglossus & Geniohyoid^{15,18,19,20}. Those few who curve the tip of tongue to touch floor make use of anterior fibers of Genioglossus²⁰. Thus many tongue muscles intrinsic and extrinsic, all innervated by Hypoglossal nerve act in coordination. Thus 90% subjects require intact and functional Hypoglossal nerve with the muscles innervated to whistle. In fact two subjects were able to whistle using exclusively tongue

and one subject informed that he gained the ability to whistle only after he underwent surgery for tongue tie.

Though mono neuropathy of Lower Motor Neuron palsy of Facial nerve especially Bell's palsy is the commonest, unilateral Hypoglossal Nerve palsy is not an uncommon finding²². XII nerve palsy is more common cranial mono neuropathy due to metastasis as stated by Walker HK²¹. It occurs also due to causes like post-operative inflammation, impacted tooth, Post Viral, Bacterial infections & vaccination, Auto Immune, even Idiopathic²² and due to trauma during air way management for General Anaesthesia during surgery²³. The person will have inability to whistle too though the dominant symptoms will be slurred speech, deviation of tongue and chewing difficulty.

Conclusion

Paralysis of Hypoglossal nerve will affect one's ability to whistle as do paralysis of Facial nerve.

Whistling is not a manly skill as there is only insignificant sex difference in the % of participants who whistled

Social inhibition may be the reason for significant number of women having had not attempted to whistle earlier

There is a subtle knowledge gap between clinicians and non-clinicians probably due to lack of need to update for the later which will become evident to students when they enter clinical side. Hence we, teachers too need to refer text books and clinical examination manuals of clinical subjects to accept, ignore and criticise as appropriate what has been given in text books and manuals of Physiology.

When clinicians were enquired told that they ask the subjects to “Blow Air” to test Buccinators; neither whistling nor blowing out the Cheeks and noting on tapping whether air escapes as mentioned in two Practical Physiology ^{4,5} and one Clinical Examination ¹⁰ book which shall actually be a test for the function of Orbicularis Oculi – to shut mouth tightly for both inflating as well as holding tight when tapped. Neither whistling nor ability to hold air in vestibule of mouth not letting out when tapped is being used to test integrity of buccinator and Facial nerve is being used by clinicians.

The study suggests that teaching whistling as a test for Buccinator’s function of retraction of Cheeks shall be stopped and we, Physiologists shall adapt clinician’s “Blow Air” test, and shall modify it. If the subject is asked to blow forcibly on the surface of a square piece of paper held vertically 10 cm in front of mouth which will visibly retract the Cheek it will be an objective test – “Blow Air on Paper” - that allows visualization and tactile sensation of movement of the paper. The action of blowing air does not require action of tongue muscles too.

Limitations

This study result is based more on subjective observation. It would have been more valid if temporary Hypoglossal nerve paralysis was induced by blocking it with local anaesthetic drug infiltration and the subjects were tested. But this becomes an invasive procedure and is unwarranted. Patients suffering from Hypoglossal nerve lesions are best option but it is not a very common disorder.

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Ethical Clearance: Obtained from Institutional Ethical Committee

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