

AN INTUITIONAL METHOD OF TRAINING THE
DEAF IN POINTS OF ARTICULATION FOR
THE CLARIFICATION OF THEIR SPEECH

—HORITA'S WAFER METHOD—

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Introduction

Japan already saw a hundred years in deaf education, during which time quite a few attempts have been made by a good many seniors with regard to the method of guidance in the articulation of deaf children's speech. All, however, had to have recourse to a method of guidance depending on years of experience and intuition and none brought forth a universal and scientific speech therapy. That means to say, deaf children's uncertainty about their tongue positions in the course of uttering speech sounds has been a tough and hard nut to crack.

Accordingly, I have made comparative studies between the tongue movements of deaf children in the course of utterance and those of ordinary children, which proved that in ten cases out of ten the tongue of the ordinary child was moving for articulation in a flat, roundish, lax and spoon-like state, whereas that of the deaf child was unnaturally moving for articulation in an unusually tense state.

From this, I have, ever since 1946, developed a new technique of guidance for the deaf in function training of speech organs by using wafer so that they may be able to speak freely and clearly like ordinary people. This has been applied to scores of deaf children, those hard of hearing, and general aphasiacs (with cleft palate, speech disorders such as stuttering, and slight weak-mindedness) and obtained amazingly fruitful results (namely, congenital deaf children showed 90-98 per cent of clearness and other aphasiacs showed nearly 100 per cent of clearness).

With All-Japan Convention of Deaf Education in 1960 as my first experience, I have read papers more than ten times, have been invited as a lecturer to over twenty schools for the deaf in Japan and each time won a great admiration of those present for my guidance through demonstration. Besides, by recommendation of the Phonetic Society of Japan, Dr. Masao Onishi kindly introduced my self-made 8mm movies to the VIth International Congress of Phonetic Sciences in Prague.

This time, further to my previous presentation at Prague, I would like to present to you the 8mm color movies designed to illustrate the tongue movements in pronouncing each consonant combined with close vowels that will be considered most difficult in teaching. I must add that in order to do this I had to have my eight front teeth cut.

I. Special Qualities of Wafer as Effective for the New Method of Guidance

We can clearly convey our meaning to the listener by uttering more than 300 syllables of words per minute. As the result of my effort to discover some

agency which enables the deaf to sensuously realize the right points of articulation through their cerebral physiology, to supplement their insufficiency of hearing and to facilitate the function of their speech organs, it has been proved that wafer can satisfy these conditions in order to equip them with such speech function.

- (1) The use of wafer interests the child so much that he willingly imitates the tongue movements for articulation because he can see them with his own eyes.
- (2) Wafer is a kind of food with some flavor and the child is willing to practice with it. There is no danger whatsoever about it.
- (3) Wafer becomes sticky when saliva comes into contact with it. So, the exact point of articulation can be indicated.
- (4) Wafer is so thin like paper that it does not interfere with tongue movements for articulation.
- (5) Wafer is useful until it melts in the mouth.
- (6) Wafer is obtainable anywhere, any time and inexpensive. It can be preserved for years.
- (7) Wafer can be cut into any form. It so happens that the tongue movements for articulation are sometimes restricted according to the size of an agency, but the use of the fragment 6mm by 10mm paved a way for a remarkable therapeutical revolution.

II. Possibility of Articulation Training by Wafer

Among all bodily organs, the tongue used for speaking has the most excellent motor function. It moves well and can freely change its form, the surface of which is covered with a mucous membrane with sharp tactual sensation. It moves for various changes of voice. Wafer adheres closely to any part of the palate on touching it. So, wafer can be placed on the intended point of articulation for a correct adjustment of the tongue form.

III. A Method of Function Training of Speech Organs for Articulation by the Instructor's Demonstration

For example, as for driving or piano practice, various movements are sensationally grasped by way of the instructor's demonstrations and thus a prescribed course of study can be completed through repeated practice. In the same manner, in the case of pronunciation teaching to the deaf, through the instructor's demonstrations with the agency of wafer, tongue movements for articulation can be correctly taught—in other words, can be sensuously acquired by the deaf.

#Demonstrations such as putting the wafer on the point of articulation for alveolar sounds or taking off the wafer placed on the point of articulation for [k] sound.

Thus, through such repeated practice of putting on or taking off the wafer.

children can gradually learn the correct tongue movements for each articulation.

(The details are illustrated by the film)

IV. A Self-Remedial Training Method of Articulation by Wafer

We always produce correct sounds with our tongue placed on regular positions. Naturally, the wafer on the tongue ought always to stick to the regular positions. The same movements as demonstrated by the instructor are asked to be imitated by the children. If the position, form, movement of the tongue is incorrect, the wafer adheres to a wrong position, or remains on the tongue. Such phenomena are often observed at the initial stage of training.

In such cases, at a glance, the deaf can confirm the incorrect tongue movements by the position of the wafer. Thus, after repeated practice they will be able to set the tongue movements for articulation properly and promptly.

As the blind can intuitively read braille type, so the deaf may be said to speak glibly when they can fix the tongue movements for articulation at their will through thorough training.

V. Guidance in Efficacious Ways of Exhalation

Some say that exhalation or voice production for each phone is the most difficult in pronunciation teaching to the deaf, but I think otherwise.

Ordinary infants come to be able to move their lips desirably for pronunciation approximately at the age of one and to learn bilabial phones such as [p, b, m]. At the age of one and a half or so, they come to be able to move the fore part of the tongue in proportion to the movement of the chin and to produce phones including [t, d, n]. In like manners, the deaf can now properly set the tongue movements for each phone with the help of wafer and so it has become possible to teach them properly in keeping with the developmental process of ordinary children.

Examples of Guidance in Exhalation

It is to be desired to proceed to the pronunciation teaching of each consonant after exhalation, strength, intermission, length and voicing of breath can be distinguished.

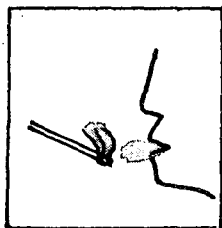


Diagram 1
Guidance in the Exhalation for [p]

- (1) Set fire to a small, thin and slender bamboo and take it near the mouth of the deaf child. Then, have him pronounce the plosive of [p] and realize the quantity of the exhalation by himself. [p] phone is thus introduced. Subsequently, have him pronounce [pa]. If the economical quantity of exhalation for [p] is known, phones such as [t, k] requiring the same quantity of exhalation can be easily and almost spontaneously introduced to them and produced by them at the signs given, provided that the tongue

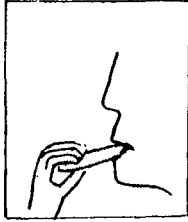


Diagram 2
Guidance in Exhalation for [m]

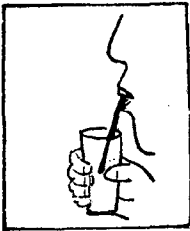


Diagram 3
Guidance in Exhalation for [b]

movements for articulation had already been determined by the help of wafer.

- (2) Have him hold a round wafer between the lips. Then, introduce the nasal sound of [m]. When the long and short intermittent sounds are produced accurately, have him utter the syllabary [ma] and realize that the syllabary he has just pronounced is to be considered in relation to the sign representing the utterance of a nasal sound. Then, the same nasal phones such as [n, ŋ] can also be easily pronounced at the sign given after the tongue movements for them have been set.
- (3) As to voiced plosives such as [b, d, g], firstly use a straw and then have him pronounce [b]. Just from how bubbles are formed, he will know the right way to pronounce it. Then, have him pronounce [ba], which is to be considered in relation to the sign representing the utterance of voiced plosives. Thus, [d, g] phones are easily introduced by signs after the tongue movements for them are well acquired.

VI. An Effectual Method of Guidance in the Clarification of Speech by Signs

What are the signs for the clarification of speech?

The method of guidance by signs (showing three-dimensional utterance) which I have developed has already been in use for some twenty years. It is neither dactylology nor a finger alphabet, but a sign three-dimensionally representing each feature of the tongue movement for the articulation of each phone, which corresponds to a score in music.

By comparing the left hand to the upper jaw and the right hand to the tongue movement, detailed guidance is intended for the production of breath and voice and also in the pith of articulation. Those deaf children who have come to be able to articulate correctly visually understand the articulation movements by looking at the series of movements represented by those signs. As a pianist can give a performance intuitively at a sheet music, they will come to be able to speak as they please with proper articulation. Later, when they come to be able to speak correctly even without signs, then they can, for the first time in their life, make themselves understood to people at large.

The Sign for the clarification of speech is made up of five vowels and fifteen consonants. For example,

VOWELS

a ... moving the opened right hand sideways to have them pronounce with

the α shape of the mouth

- o ... giving them a sign like holding an egg softly by thrusting out their right hand to have them pronounce with the O shape of the mouth
- u ... giving a sign like holding a pingpong ball to have them do the like
- e ... moving the right hand sideways with two fingers forming the shape of V laid on the side
- i ... moving the right hand from left to right with the forefinger horizontally placed

All the signs above are intended for enabling them to realize the magnitude of an ordinary speaking voice by having them confirm it by an acousticon or by the motion of the needle of a noise measure during their pronunciation.

CONSONANTS

- s ... rubbing the back of the left hand with the right hand. Along with this action, have them exhale through the straw aiming at the production of fricatives until they can pronounce long and short fricatives with accuracy. After this, have them exhale at the sign given without the help of a straw. When the sound pronounced is weak, rub your hands forcibly in order to have them pronounce strongly and when the sound is too strong, adjust it by rubbing hands softly until at last they realize by signs how proper fricatives are formed.
- t ... moving the right hand with its back underneath as if to stroke something lightly, showing the tongue movement for the articulation of [t] phone. The force of breath is adjusted by the speed of the movement of the right hand.
- p ... first joining the thumb and the other four fingers of the right hand and then opening them suddenly. This motion is to be considered in relation to the pith of the exhalation of [p].
- k ... suddenly putting down the forefinger of the right hand firstly placed on the throat. This movement is to be considered in relation to the pronunciation of [k].
- g ... putting down two fingers of the right hand firstly placed on the throat as in [k], which is to be considered in relation to the phone of [g].
- r ... spreading out the four fingers (except the thumb) of the right hand with its back underneath that are firstly bent inwards. This motion is to be considered in relation to the phone of [r].
- m ... having them feel the vibration of the nasal sound of [m] by the forefinger of the right hand placed on the lips, which is to be considered in relation to [m] phone.
- b ... severing suddenly the thumb and the other two fingers (the forefinger and the middle finger) that are firstly joined. This sign is to be considered in relation to the phone of [b].

These are some examples of signs, which are shown together with words or sentences. It is important to give instructions speedily according to words spoken.

VII. It Shows a Marvellous Effect on the Clarification of Deaf Children's Speech

1. **Miraculous Results Effected by All Deaf Children**
 - # Even congenital deaf children produce the 90-98 per cent of clearness.
 - # Guidance at the age of two or three brings about cleancut articulation.
 - # Speech therapy is possible even to older people. Cured people are found even among those aged twenty at oldest.
 - # Their neighbors would not think they are deaf when they hear them speak.
 - # The family are happy because such children talk neither by reading aloud from a written note nor with gestures.
 - # It is quite possible to communicate with ordinary people. Such marriage cases are reported as well.
 - # The wafer method is very effective for character building of the deaf.
 - # Clearness in speech once acquired by the wafer method will never vanish.
2. **Effects for Children Hard of Hearing (60-80 dB) Also Are Striking.**
 - # Clearness of speech gets near 100 per cent.
 - # Clear-cut articulation is preserved and they become very good at hearing by their audibility.
 - # Those children whose average scores were 20-30 come to win distinction in scholarship after the speech therapy and be very eager to play with neighboring children.

VIII. Aphasias Recover Almost Perfectly

Curing of speech disorders by cleft palate that have been considered impossible.

Speech therapy of speech disorders by cleft palate beyond the age of seventeen have been considered almost impossible. However, by the wafer method, for instance, Miss A got cured at the age of twenty by having being treated once every week for two years after the second operation on the hairlipped cleft palate at the age of eighteen. Miss B who underwent the second operation for the same at the age of seventeen began getting treated twice a week at the age of twenty-three, and got cured in ten months time. One year later, she got married and gave birth to a boy.

Almost all those with dysarthria are cured.

Those people mostly suffering from partial dysarthria such as the ha, sa, ra, ka series of syllabaries in the Japanese alphabet all get cured by the wafer method in three to twelve months.

It is also effectual for dysarthria caused by cerebral hemorrhage.

It depends on the seriousness of cerebral hemorrhage, but usually those not so seriously struck with it chiefly suffer from the functional disorder of the back and forth movement of the tongue and when they are treated by the wafer method, they recover relatively sooner than expected.

It is also effectual for those mentally disordered.

Clinical data are rather scanty, but speech disorders of bilabial sounds in the thirties of I.Q., of alveolar sounds such as [t, d, n] in the forties of I.Q. and of [h, s, r, k] sounds in the fifties of I.Q. are reported. In the case of A aged nine with I.Q. 45 came to be able to produce the ta series of syllabaries of the Japanese alphabet after getting treated two or three times. A four-year-old B with I.Q. 30 came to be able to pronounce papa and mama.

A cure for stammerers is easy.

Even heavy stammerers such as those who stutter more than five seconds as they begin to talk got all cured by the wafer method in one year's time. Most stammerers, if trained with wafer for articulation, will get cured at an early stage.

IX. Even Deaf People Can Speak Foreign Languages

The deaf who are not good at English will come to have a good command of spoken English by acquiring points of articulation in English. Even in teaching a foreign language to ordinary people, this method is effective because points of articulation are well learned by the wafer.

Now, I would like to introduce to you the movies showing how the deaf can be trained in articulation.

< 우리 말 요약 >

이 논문은 일본의 호리따씨가 1983년 8월 교베시에서 열린 제 4 차 세계 음성학자 대회에서 발표한 내용의 영역본이다. "음성언어의 직감적 개발"이란 부제가 붙은 "위이취 방법"이란 호리따씨가 개발해 낸 농아와 그밖의 언어장애자의 발음 훈련 및 교정법인데, 혀의 감각이 둔한 장애자의 혀에 종이같이 얇은 과자 조각을 붙여서 발음하게 함으로써 정확한 조음 위치를 파악하여 올바른 발음을 익히도록 하는 방법이다. 대회에서도 상당한 관심을 끈 논문이므로 우리나라의 언어치료계를 위하여 소개한다. 이 방법은 음성훈련 및 외국어의 발음교육에도 이용될 수 있을 듯 하다.

< 이 현 복 >

AN INTUITIONAL METHOD OF TRAINING THE DEAF IN POINTS OF ARTICULATION FOR THE CLARIFICATION OF THEIR SPEECH

8mm Color Film, W size, Duration of 20 Minutes

Title

This is a film introducing a method of training in functioning the speech organs for enabling deaf children to sensuously grasp the points of articulation and to speak as clearly as ordinary people.

The speech organs of deaf children, although physiologically perfectly normal, are not quite normally developed in functions of articulation because of the disorder of their auditory sense; accordingly, their speech is not clear.

So, in order to actuate the development of the children's functions of articulation, wafer is used to enable them to intuitively realize the points of articulation and also some economical ways of exhalation. In other words, this is an educational film designed to foster their speech so as to make it as clear as ordinary people's.

t, d, n phones

According to the diagram of articulation, it appears as if the tip of the tongue touched the central teethridge in the case of [t, d, n] phones. However, the cross section of the articulation shows that both sides of the tongue are in contact with the gums of the back teeth with an opening of approximately 6mm between the tongue and the hard palate, forming a bag-like shape of articulation, which is the most important point.

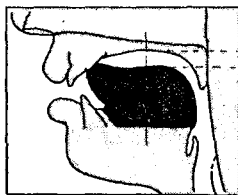


Diagram 4
Articulation of [t, d,
n]

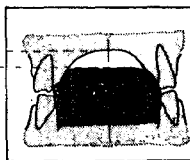


Diagram 5
Cross section of the
left

Now, let us explain the difference between the articulation of an ordinary child and that of a deaf child by way of models as well as diagrams.

The Model of the Tongue

The model with ○ stands for the tongue of an ordinary child and the model with × for the typical tongue of a deaf child. With such a pointed

tongue, as almost no stricture is formed between the tongue and the hard palate, it is not possible to pronounce clearly. Because of the articulation movement of the stick-like tongue, the two pieces of wafer that had been placed on the tongue both stick to the palate, showing that the articulation is not proper. That is in this way known even visually.

(Diagram 6 is an example showing the typical tongue movement for articulation of a deaf child)

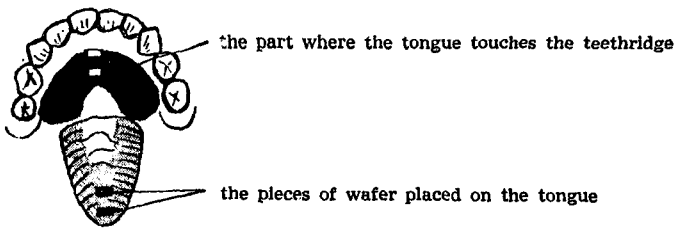
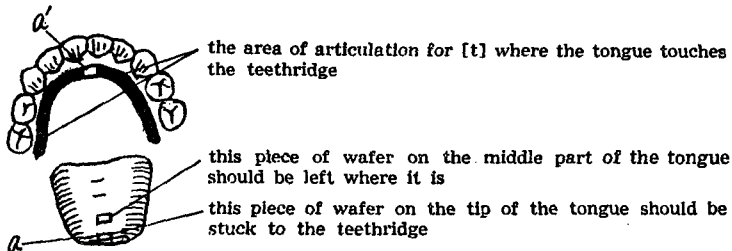


Diagram 6
the palate and the
tongue with x mark



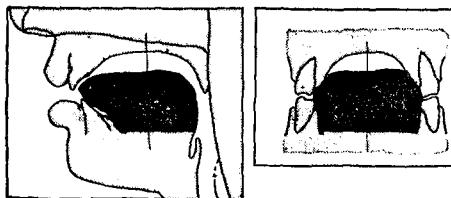
7. Diagram showing the
articulation of [t]

Now, this shows a way of articulation by the spoon-shaped tongue and the teeth. This kind of bag-like gap is formed between the normal tongue and the hard palate. If the gap is proper, [t, d, n] phones are properly articulated. Please look at the movement of the spoon-shaped tongue. Out of the two pieces of wafer, the one placed on the tip of the tongue can be stuck skillfully to the central teethridge. In this case, care must be taken to always leave behind the other one placed on the middle part of the tongue (even while practicing pronunciation) so that the form of the tongue for articulation remains all right. As illustrated by this film, if and when the child can stick the wafer put on the

tip of the tongue on to the central teethridge seven times successively, it might be conjectured that he has somehow acquired the skill of articulation for alveolars such as [t, d, n]. Subsequently, the way of exhalation, namely, that of pronunciation, should be introduced and learned. Thus, close to 100 per cent of success rate can be obtained.

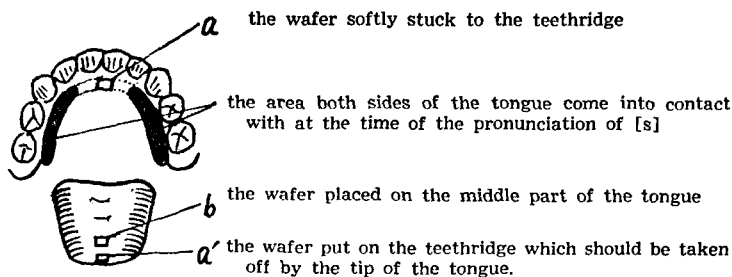
Artificial Teeth This film is made for enabling them to realize how the sounds that are particularly difficult to teach are formed. For this purpose, the instructor had his eight upper front teeth cut and when the artificial teeth in place of them are taken off, the tongue movements for articulation are very well observed.

sa syllabary



8. Articulation of [s]

9. Cross section of the left of [s]



10. Diagram of the palate when [s] is articulated

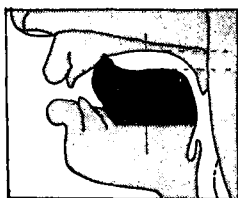
According to the articulation diagram, the second [s] is articulated only with the blade of the tongue. It appears as if the other surface of the tongue did not come in contact with any part of the palate. However, as the cross section of the articulation diagram shows, both sides of the tongue must stick fast to the gums of the back teeth. It is important that the opening between the central part of the tongue and the hard palate should form an approximately 6mm compass for articulation and also a stricture of approximately 0.2-3mm between the blade of the tongue and the back part of the front teeth. For this purpose, training in functioning the speech organs for articulation is effective.

The wafer placed on the middle part of the tongue should be kept as it is because the correct tongue position must always be maintained. At the beginning, the children cannot move their tongue well, but after some practice

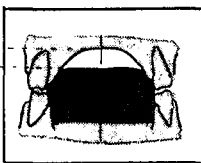
they become very skillful and come to be able to move them intuitively. After this kind of function training, they are asked to hold a straw between the tongue and the front teeth, through which they will be told to breathe forth. Then, every child can produce [s] sound.

su syllabary

This phone having a fairly close vowel, it is almost impossible to enable them to know the tongue movement. However, when it is pronounced without the artificial teeth, the tongue movement is observable. For the articulation of this syllabary, it is necessary for both sides of the tongue to stick fast to the gums of the back teeth and for the whole tongue to be shaped like a spoon.



11. articulation of [ra]

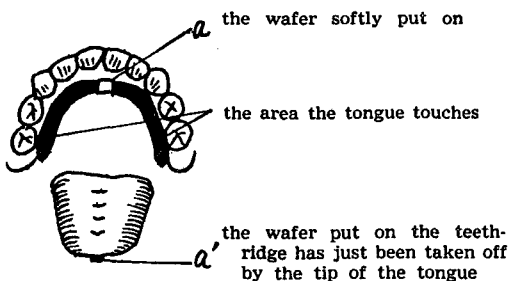


12. cross section of the left

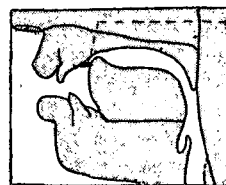
rz syllabary

According to the articulation diagram, it would seem as if [ra] syllabary were produced by slapping the tongue with its tip bent inwards against the teethridge. However, as shown in the cross section of the articulation, it should actually be articulated by

slapping the end of the blade of the tongue against the teethridge while both sides of the tongue are in contact with the gums of the back teeth. In order to enable them to sensuously acquire this articulation movement, they are asked to slap off the wafer (a) placed on the gums of the back teeth, as illustrated in the diagram, with the back part of the tip of the tongue. Then, the wafer



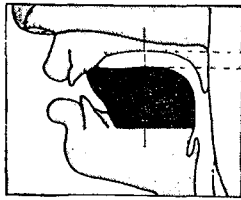
13. articulation of [ra]



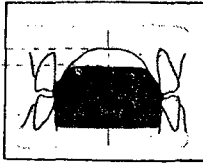
14. the wafer softly put on the gums of the back teeth

sticks to the back of the tip of the tongue. The most important point is to have them do this action with a roundish soft tip of the tongue. When this is well done, guidance in pronunciation should be provided in accordance with the finger sign given. Then, you will know the deaf children learn it much sooner than expected.

tsu, dzu syllabary



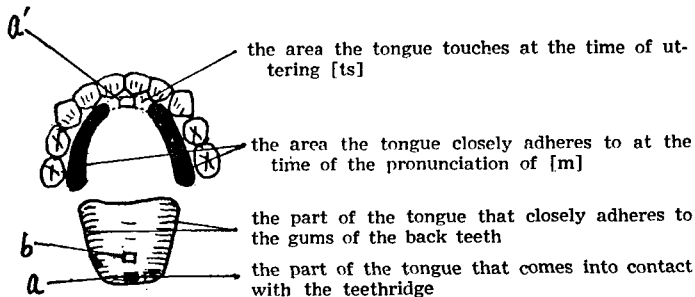
15. articulation of [ts, dz]



16. the cross section of the left

These are the group of phones which are difficult for the deaf children to pronounce because the tongue movements for the production of these phones having the close vowel of [u] are not observed at all from outside, although the shape of the mouth for the articulation of [u] may be seen. So, in this case, two pieces of wafer are to be placed

on the blade of the tongue—one on the center of the teethridge that is the point of articulation and the other on the front of the tongue, which should always be left behind. You will see how without the artificial teeth the mouth is widely opened in order to show the tongue movement.

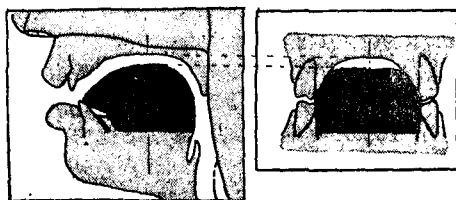


17. the cross section of the articulation of [ts, dz]

When the above-mentioned articulation movement can be properly determined intuitively, it will be easier to enable them to acquire clear phones such as [ts, dz, n] through guidance in pronunciation.

i series of phones

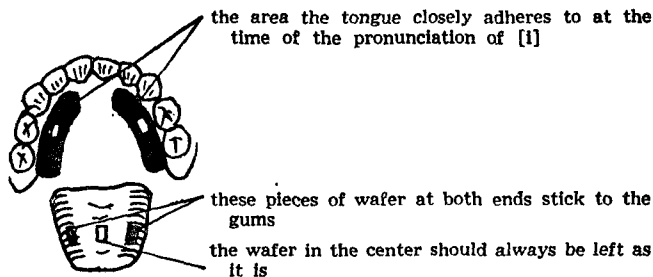
According to the articulation diagram, it looks as if the tongue for the articulation of [i] series of phones did not touch any part of the palate. But, in actuality, both sides of the tongue closely adhere to the gums of the back teeth, with the center of the tongue very near the hard palate, forming a stricture of approximately 3mm.



18. articulation of [i] the cross section of the left

In order to enable them to intuitively acquire this articulation movement, three pieces of wafer should be placed on

the tongue as shown in the diagram—the pieces of wafer on each end should stick fast to the gums of the back teeth and the middle one should always remain as it is. When this kind of function training is completed, they will be



the area the tongue closely adheres to at the time of the pronunciation of [i]

these pieces of wafer at both ends stick to the gums
the wafer in the center should always be left as it is

19. the palate and articulation of [i]

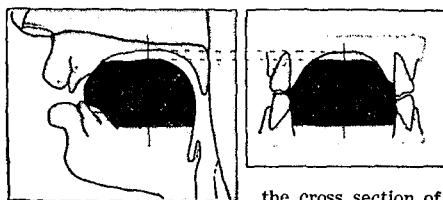
able to articulate [i] properly. If the position of wafer is out of place, they might produce obscure sounds. Therefore, it is always necessary to assure them, with the help of the mirror, of the right point of articulation.

mi syllabary

Many of the deaf children cannot distinguish between [mi] and [mɛ]. So, it is of vital importance to enable them to confirm the articulation of [i] while teaching the syllabary.

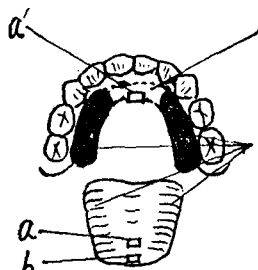
tʃi, dʒi syllabary

According to the articulation diagram, for the articulation of [tʃ, dʒ], it appears as if only the front of the tongue were in contact with the gums of the back teeth. However, as shown in the cross section of the articulation diagram, it is important that both sides of the tongue should closely adhere the gums of the back teeth forming a bag-shaped compass for articulation.



20. articulation of
[tʃi, dʒi]

the cross section of
the left



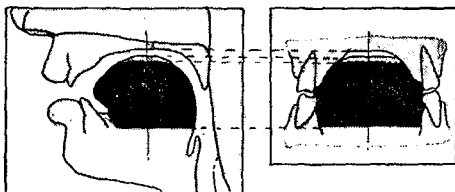
the area the tongue comes in contact with at
the time of the pronunciation of [tʃ]

the area the tongue closely adheres to at the
pronunciation of [i]

the wafer on the middle of the tongue should
be stuck to the gums of the back teeth

21. the palate and the
articulation of [tʃi]

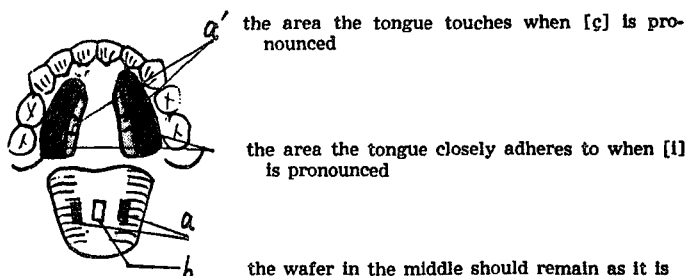
So, after having them confirm how [i] is to be articulated, have them place two pieces of wafer on the tongue—one (b) on the tip of the tongue, which should always remain as it is and the other (a) on the middle part of the tongue, which should be stuck to the gums of the back teeth. (a') Thus, the correct sense of articulation should be well developed. After this is acquired accurately, teach them how to exhale for the production of plosives and also how to pronounce them properly. Then, the syllabary [tʃi] will be clearly pronounced.

çi syllabary

22. Articulation of [çi]

the cross section of
the left

The syllabary [çi] is one of the most difficult syllabaries for the deaf children to pronounce. They are first asked to make the same articulation for [çi] as for the phone [i] and then to get the middle part of the tongue near the hard palate, causing a slight fricative in the stricture formed.

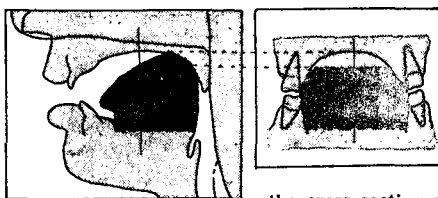


23. the palate and the articulation of [ç]

In order to enable them to acquire this pith of articulation, three pieces of wafer should be placed on the middle part of the tongue. The pieces of wafer on both ends (a) should be stuck to the farther back part of the palate (a'). Then, they are asked to exhale through the stricture under (a') causing a slight fricative [ç]. When this function training has been well conducted, the phone [i] should be combined with it. Finally, the syllabary [çi] should be practiced.

n syllabary

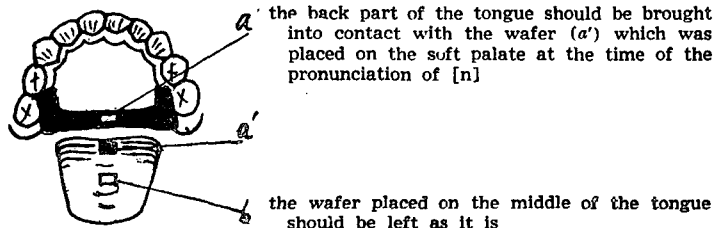
There are five kinds of [n] in the Japanese language, out of which the one



24. articulation of [n] the left

formed with the back of the tongue and the soft palate that is considered most difficult to teach to the deaf children is dealt with here. This phone is articulated with the soft palate and the back of the tongue, forming a nasal sound. So, wafer (a) is put on the soft palate, which should be taken

off by the back of the tongue.(a') Then, the articulation (a') of [n] should



25. the palate and the articulation of [n]

be made. It is easy to know by tactual sensation the point of articulation by bringing the back of the tongue into contact with the wafer.