

TOLKĀPPIYAR'S TREATISE ON PHONETICS: A DETAILED STUDY

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Abstract

This study is aimed to offer detailed information of phonetics that has been narrated by Tolkapiyar about 2100 years ago. The phonetics of Tamil has never been studied properly in any way. To substitute the need, this study has offered a comprehensive look on Tamil phonetics properties using a linguistics perspectives. In comparison, grammatical enumeration and linguistics specifications able to offer a detailed account of Tamil phonetic system and its appropriateness.

Keywords

Tolkaappiyam, Phonetics, Phonology, Old Tamil Grammar

ஆய்வுச் சுருக்கம்

சுமார் 2100 ஆண்டுகளுக்கு முன் தொல்காப்பியர் உரைத்த ஒலியியல் பற்றிய விரிவான தகவல்களை வழங்குவதே இந்த ஆய்வின் நோக்கமாகும். தமிழின் ஒலியியலை எந்த வகையிலும் முறையாகத் தமிழ் மொழியில் பார்ப்பதற்கில்லை. அதற்கு எதிர்மறையாக, இந்த ஆய்வு மொழியியல் கண்ணோட்டத்தைப் பயன்படுத்தி தமிழ் ஒலிப்பு பண்புகள், ஒலியியல் தன்மைகள் ஆகியவற்றின் விரிவான பார்வையை வழங்கியுள்ளது. ஒப்பிடுகையில், இலக்கணக் கணக்கீடு மற்றும் மொழியியல் குறிப்புகள் தமிழ் ஒலிப்பு முறை மற்றும் அதன் பொருத்தம் பற்றிய விரிவான விளக்கங்களை வழங்க முடியும், என்பதனை இவ்வாய்வு உறுதிப்படுத்தி உள்ளது.

கருச்சொற்கள்

தொல்காப்பியம், ஒலியியல், ஒலியனியல், பழந்தமிழ் இலக்கணம்

Introduction

The first traditional grammarian of Tamil, Tolkāppiyar describes all features of phonology such as phonemes, allophones, phonemic structure, phonetic symbols, morpho-phonemics, alternations, juncture, phonetics changes and canonical forms of sounds in the first part (*Eḷuttatikāram*) of *Tolkāppiyam*. The *Eḷuttatikāram* has nine chapters, *Nūṇmarapu* (Tol.Eḷu.1-33), *Moḷimarapu* (Tol.Eḷu.34-82), *Piṟappiyal* (Tol.Eḷu.83-102), *Puṇariyal* (Tol.Eḷu.103-142), *Tokaimarapu* (Tol.Eḷu.143-172), *Urūpiyal* (Tol.Eḷu.173-202), *Uyirmayankiyal* (Tol.Eḷu.203-295), *Puḷḷimayankiyal* (Tol.Eḷu.296-405) and *Kurriyalukarap puṇariyal* (Tol.Eḷu.406-483). These nine chapters divide in to three categories basis subject, first two chapters discussed the phonemics, third the chapter defines the articulatory phonetics, and the last six chapters describes the coalescence (sandhi). Here primarily considers Tolkāppiyar's *Piṟappiyal*. Tolkāppiyar discusses the articulatory process of all speech sounds, points of articulation and manners of articulation etc. in the chapter of *Piṟappiyal*.

The structure of the *piṟappiyal* (Chapter of Articulatory Phonetics)

Tolkāppiyar arranges the *piṟappiyal* in following order: Common features of the speech production (eight organs of speech) (nūṟpā/sūtra 83)

- i. Three Air chambers: Head, Throat and Chest
- ii. Five Articulators
 - a. Three Active articulators: Teeth, Lips and Tongue
 - b. Two Passive articulators: Nose and Palate

Points and manners of articulation of the sounds (nūrpās/sūtras 84-101)

- i. Primary sounds: (nūrpās/sūtras 84-100)
 - a. Twelve vowels (nūrpās/sūtras 84-88)
 - b. Eighteen consonants (nūrpās/sūtras 89-100)
- ii. Secondary sounds [*cārpeluttukkal*] (nūrpā/sūtra 101)
 - a. Three secondary sounds (Allophones)

Common features of the speech production of Tolkāppiyar

Tolkāppiyar mention the eight common features of the speech production (air-stream, oral and nasal cavities, active and passive articulators etc.) in the first nūrpā/sūtra of *pirappiyal*, they:

*until mutalā muntu vaḷi tōṇṇirit
talaiyiṇum miṭarriṇum neñciṇum nilai-ip
pallum itaḷum nāvum mūkkum
aṇṇamum uḷappaṭa eṇmurai nilaiyāṇ
uruppuur ṛ-amaiya neṛippaṭa nāṭi
ellā v-eḷuttuṇ colluṇ kālaiṇ
pirappiṇ ākkam vēru-vē ṛ-iyala
tirappaṭat teriyuṇ kāṭci y-āṇa*

Tol.Eḷu.83

It will be evident on careful observation that all sounds when pronounced are produced in different ways as the results of the modifications undergone by the rising air starting from the navel and passing through the eight places in [its] course- the head, and the throat, and the chest, the teeth, and the lips, and the tongue, and the nose; and the palate ¹

Tolkāppiyar describes the origin and movement of the air in the beginning of the nūrpā/sūtra, “*unti mutalā muntu vaḷi tōṇṇiri*” it means raising the air from the Diaphragm. It (air) is a key to speech production. Both commentators of *Tolkāppiyam*, ḷampūraṇar (AD.1100) and Nacciṇārkkīṇiyar (AD.1400) describe the “*unti*” as navel (*koppūḷ*). K.Murugaiyan² and S.V.Shanmugam³ both of defines the “*unti*” as Diaphragm. The air reaching the three points (head, throat, and chest) and involving the five articulators (teeth, lips, tongue, nose and palate) to produce the different sounds. Tolkāppiyar classifies the speech organs into two that, air chambers and articulators. Modern phoneticians agree with Tolkāppiyar’s classification of speech organs. The first division consists of the head, throat, and chest. These are

¹ Zvelebil, K. (1972). Tolkāppiyam - Eḷuttatikāram English translation. *Journal of Tamil studies*, 1(1), p.51.

² Murugayan, K. (1972). Tolkāppiyariṇ oliyiyal koḷkai. Tolkāppiya moḷiyiyal, In Ca.Akattiyaliṅkam, K.Murukaiyan (eds.), p.5.

³ Caṇmukam, Ce.Vai. (2001). Eḷuttalakkaṇak kōṭpāṭu (Mutal patippu), p.48.

functioning as respiratory, phonatory and articulatory systems respectively.⁴ The second division consists of the rest which are situated in the head namely teeth (*pal*), lips (*ital*), tongue (*nā*), nose (*mūkkū*) and palate (*annam*). This division plays the major role in articulating speech sounds.⁵ Tolkāppiyar enumerates the total number of speech organs as eight, does not divide them in numbers. Vīramāmuṇivar (AD.1700) divides the speech organs clearly, he divides them in to two groups that air chambers and articulators and he called them orderly primary points (places) (*mutal iṭam*) and secondary points (*tuṇai iṭam*).⁶ He enumerates the articulators as five, does not enumerate the air chambers. All other grammarians are not enumerating the speech organs in number. Tolkāppiyar arranges the air chambers and the articulators in following order: Air chambers: head, throat, and chest; Articulators: teeth, lips, tongue, nose and palate. In the order of articulators, he mentions the first, active articulators (teeth, lips, tongue) and then passive articulators (nose, palate).

Comparison of Common features of the speech production of Tolkāppiyar and other Tamil grammarians

All the Tamil grammarians mention the eight organs of speech and classifying into two groups as air chambers and articulators. They are mentioning the first, air chambers and then articulators. A number of the air chambers and articulators is changed by the grammarians. Tolkāppiyar, Kuṇavīrapaṇṭitar (AD.1200) and Vīramāmuṇivar (AD.1700) mentions three air chambers and five articulators, they are talk about the nose as articulator. The nasal cavity (nose) behaves just like the other articulators in helping for the production of sounds using the energy obtained from the air contained in the first division of organs.⁷ Puttamittiraṇār (AD. 1100), Pavananti muṇivar (AD.1300) and Vaittiyanāta tēcīkar (AD.1700) mentions both of four (four air chambers and four articulators), they are listing the air chambers including the nose. It will be described in the table 2.1.

Table 2.1 Tamil Grammarians placed the Air chambers and Articulators

Period	Grammarian	Grammar	Nūpa no. in the text	Order of the Air Chambers	Total number of Air Chambers	Order of the Articulators	Total number of Articulators	Total number of
BC. 300	Tolkāppiyar	Tolkāppiyam	83	Head, Throat and Chest	3	Teeth, Lips, Tongue, Nose and Palate	5	8
AD. 1100	Puttamittiraṇār	Vīracōliyam	6	Chest, Head, Throat and Nose	4	Palate, Teeth, Lips and Tongue	4	8
AD. 1200	Kuṇavīrapaṇṭitar	Nēminātam	6	Chest, Head and Throat	3	Teeth, Tongue, Palate, Lips and Nose	5	8

⁴ K.Murugayan, "Articulation as Described by Tamil Grammarians", *Journal of Tamil Studies*, vol.03, 1973, p.45.

⁵ Ibid.

⁶ *Toṇṇūlvilakkam* 3.

⁷ K.Murugayan, "Articulation as Described by Tamil Grammarians", *Journal of Tamil Studies*, vol.03, 1973, p.46.

AD. 1300	Pavananti muṇivar	Naṇṇūl	74	Chest, Throat, Top of the head (<i>ucci</i>) and Nose	4	Lips, Tongue, Teeth, and Palate	4	8
AD. 1700	Vaittiyanāta tēcīkar	Ilakkaṇa viḷakkam	9	Top of the head (<i>ucci</i>), Throat, Chest and Nose	4	Lips, Tongue, Teeth, and Palate	4	8
AD. 1700	Vīramāmuṇivar	Toṇṇūl viḷakkam	3	Throat, Chest and Top of the head (<i>ucci</i>)	3	Lips, Nose, Palate Teeth and Tongue	5	8

Comparison of Common features of the speech production of Tolkāppiyar and Pāṇini

In Sanskrit, the *Pāṇiniya śikṣa* also mention eight organs of speech⁸ in different order. The classification of the speech organs is same in the *Tolkāppiyam* and *Pāṇiniya śikṣa*.⁹ Both of them classified the first, air chambers and then articulators. This classification is common in the Indian phonetic system. The arrangement of three air chambers and five articulators is different order in the *Pāṇiniya śikṣa* and *Tolkāppiyam*, as compared in the following charts:

Chart 2.1 Tolkāppiyar order of the Air chambers

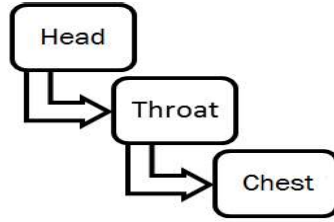


Chart 2.2 Pāṇini order of the Air chambers

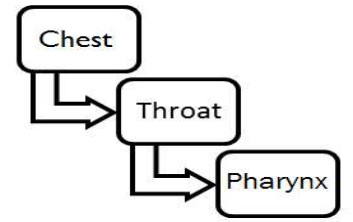


Chart 2.3 Tolkāppiyar order of the Articulators:

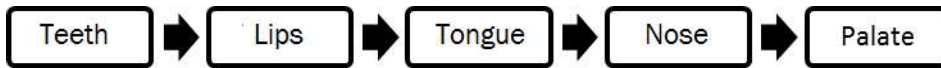
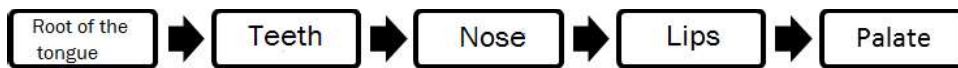


Chart 2.4 Pāṇini order of the Articulators:



Pāṇini arranges the air chambers from the chest to pharynx, but Tolkāppiyar arranges in the opposite order from head to chest. Pāṇini does not mention the head as an air chamber, and he divides the throat cavity in

⁸ *Pāṇiniya śikṣa* 6-18.

⁹ It was discussed briefly by P.S.Subrahmanya Sastri in *History of grammatical theories in Tamil and their relation to the grammatical literature in Sanskrit*. first ed.1934, rep.1997, and p.6. & K.Murgaiyan also discussed in *Tolkāppiyar Pirappiyal and Paninia Siksa - A Comparative Study*, IJDL, vol.XVI, no.1, 1987, p.127.

to two throat and pharynx. In the description of articulators both mentioned six articulators (lips, teeth, tongue, palate and nose) in different order and they indicate the nose as articulator. Both of them complete the list of articulators with palate. Pāṇini's term for the tongue *jihvāmūla*, it means root of the tongue. He describes only the root of the tongue as an articulator. *jihvāmūla* is a part of the tongue, it does not cover the full form (tip, edge and middle part) of the tongue. Tolkāppiyar mention the full form of the tongue as *nā*, it covers the tip, edge, middle and root of the tongue. Modern phoneticians agree with Tolkāppiyar point of view in the description of the tongue and disagrees the classification of the nose, the nose is an air chamber not articulator.

Classification of speech sounds of Tolkāppiyar and other Tamil grammarians

Most of the Tamil grammarians classify the speech sounds into two categories, primary and secondary.¹⁰ Respectively called them *mutaleḷuttu* and *cārpeluttu*. Tolkāppiyar mentions the primary sounds as thirty, secondary sounds as three.¹¹ Puttamittiraṇār discuss the primary sounds as thirty-one with *āytam* and the secondary sounds as eleven.¹² Kuṇaviraṇṇāṭṭar says, thirty-one primary sounds with *āytam* and 244 secondary sounds.¹³ Pavananti muṇivar mentions the thirty primary sounds and ten secondary sounds.¹⁴ Vīramāmuṇivar says that the primary sounds as thirty, secondary sounds as nine.¹⁵ Muttuvīra upāttiyāyar mentions that the thirty primary sounds and two secondary sounds.¹⁶ They are describing clearly the points and manners of articulation of both the primary and secondary sounds.

Primary sounds

Tolkāppiyar used the term “*eḷuttu*” for the speech sound (phone). He uses the same term for the following senses phoneme and grapheme. Most of the places he uses the term “*eḷuttu*” in the sense of phoneme.¹⁷ He describes the thirty primary sounds and divide them in to two separations that vowels and consonants. He lists the vowels as twelve and the consonants as eighteen,¹⁸ they:

Table 2.2 Primary sounds of Tamil

Vowels	Consonants
a ā i ī u ū e ē a c c̄ a i u	k ṅ c ṅ̄ ṭ ṇ t r p n y r l v ḷ ḹ r ṇ
அ ஆ இ இய உ ஊ ஏ ஏய அ ச ச̄ அ இ உ	க ங ச ங̄ ட ண த ர ப ந ய ர ல வ ள ள̄ ர ண

Tolkāppiyar's treatment of vowels

Tolkāppiyar treats the vowels in following order: Classification of the vowels basis time duration (*māttirai*) as short and long (Tol.El.3 and 4) List of total vowels (Tol.El.8). Common feature of the speech production of the vowels (Tol.El.84). Manner of articulation of the vowels (Tol.El.85, 86 and 87). Tolkāppiyar mention the vowels as twelve¹⁹ and he classifies them in to two categories²⁰ short and

¹⁰ First nūrpā of the eḷuttatikāram in *Tolkāppiyam*; *Naṇṇūl* 58; *Toṇṇūlviḷakkam* 5 and *Muttuvīriyam* 4.

¹¹ First nūrpā of the *Tolkāppiyam*.

¹² *Vīracōliyam* 1,2,3 and 5.

¹³ *Nēminātam* 1,3 and 4.

¹⁴ *Naṇṇūl* 59 and 60.

¹⁵ *Toṇṇūlviḷakkam* 5.

¹⁶ *Muttuvīriyam* 22.

¹⁷ Va.Cupa.Māṇikkam. *Mārroliyan*, te.Po.Mī.Maṇivīlā malar, 1961, p.365. &

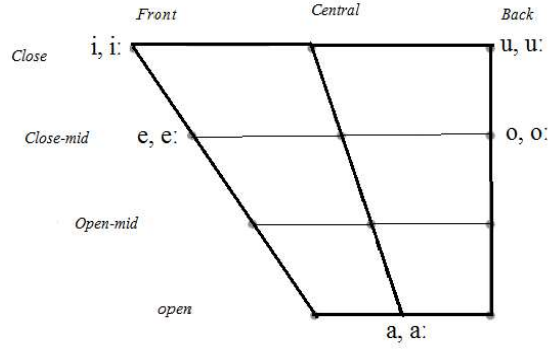
ka.Murukaiyan. "Tolkāppiyarin oliyiyal koḷkai", *tolkāppiya moliyiyal*, 1972,p.33.

¹⁸ *Tolkāppiyam* 8 and 9.

¹⁹ *Tolkāppiyam* 8.

long basis time duration. He lists the short vowels as five, *a*, *i*, *u*, *e* and *o*, the long vowels as seven, *ā*, *ī*, *ū*, *ē*, *ai*, *ō* and *au*, respectively called them orderly *kurṛeḷuttu*²¹ and *neṭṭeḷuttu*.²² In the list of long sounds, *ai* and *au* are diphthongs.²³ Tolkāppiyar states the diphthong, “*akra ikara m-aikāramākum*” [a + i = ai] and “*akara ukara maikāramākum*” [a + u = au] (Tol.Eḷu.54, 55).

Chart 2.5 Tamil cardinal vowels



All the twelve vowels are produced by the air: it's starting from the navel and passing through the neck (glottis) without undergoing any modification. Tolkāppiyar categorized the manner of articulation of the vowels in three folders. All the later grammarians are followed this classification with order. They are:

1. Opening the mouth (mid vowels)
2. The edges of the front of the tongue touch the teeth ridge (front vowels)
3. Rounding the lips (back vowels)

1. Opening the mouth:

Tolkāppiyar defines this manner for the production of *a*, *ā* and he lists two vowels (short one *a* and long one *ā*) in this sense.

a ā āyiraṇ ṭaṅkān ṭiyalum - Tol.Eḷu.85

[a, ā] those two, are uttered by opening the mouth.

2. The edges of the front of the tongue touch the teeth ridge:

Tolkāppiyar lists the five vowels in this sense that, two short vowels: *i* and *e*, two long vowels: *ī* and *ē* and a diphthong: *ai*.

i ī e ē ai eṇa icaikkum

appāl aintum avarrō raṇṇa

avaitām,

aṇpal mutalnā viḷimpuṇal uṭaiya- Tol.Eḷu.86

²⁰ Ibid.3 and 4.

²¹ *Tolkāppiyam* 3.

²² Ibid.4.

²³ Ka.Murukaiyaṇ. "Tolkāppiyariṇ oliyiyal koḷkai", *Tolkāppiya moliyiyal*, 1972, p.34.

The five vowels will be produced in the same way (opening the mouth) as the edges of the front of the tongue touch the teeth ridge [i, ī, e, ē and ai]

3. Rounding the lips:

Tolkāppiyar lists the five vowels in this sense that, two short vowels: *u* and *o*, two long vowels: *ū* and *ō*, and a diphthong: *au*.

u ū o ō au eṇa icaikkum
appāl aintum itaḷkuvin tiyalum - Tol.E|u.87

The five sounds *u*, *ū*, *o*, *ō* and *au* are produced by rounding the lips.

Pavananti muṇivar, Vaittiyanāta tēcīkar and Muttuvīra upāttiyāyar are repeated Tolkāppiyar's definition of manners of articulation of the vowels. They are:

ankappu (opening the mouth) for *a* and *ā*. (Tol.E|u.85), (Naṇ.76), (Ila.vi.11), (Mu.vī.44)
aṇpal mutalnā viḷimpuural (the edges of the front of the tongue touch the teeth ridge) for *i*, *ī*, *e*, *ē* and *ai*. (Tol.E|u.86), (Naṇ.77), (Ila.vi.11), (Mu.vī.45).
itaḷkuvivu (rounding the lips) for *u*, *ū*, *o*, *ō* and *au*. (Tol.E|u.87), (Naṇ.78), (Ila.vi.11), (Mu.vī.46)

Tolkāppiyar's theory in the treatment of vowels

Tolkāppiyar describes the vowels systematically. His theory of vowel description discussed in three folders that, Classification of vowels, List of vowels and Manner of articulation of vowels. After the list of primary and secondary sounds, Tolkāppiyar mention the classification of vowels as short and long basis time duration. He explains the short and long vowels as following:

1. Classification of vowels (Tol.E|u.3, 4)

Name of the sounds (*a i u e o / ā ī ū ē ai ō au*)
Total number of the sounds (*aintum / ēlum*)
Time duration of the sounds (*ōraḷapu / īraḷapu*)
Category of the sounds (*kurreḷuttu / neṭṭeḷuttu*)
Quotation (*eṇpa*)

Tolkāppiyar using the same method for categorized the vowels as short and long. First, he mention the name of all short (*a i u e o*) and long (*ā ī ū ī ai ō au*) vowels, then count the all vowels in number as five and seven (*aintum / ēlum*), then gives the tome duration, one *māttirai* and two *māttirai* (*ōraḷapu / īraḷapu*), then categorized them as short and long (*kurreḷuttu / neṭṭeḷuttu*) and the last he quote as *eṇpa*.

2. List of vowels (Tol.E|u.8)

Last sound (*au*) of the vowels of standard alphabet order (*aukāra*). Total sounds in number (*paṇṇireḷuttum*), Category of the sound (*uyireṇa*), Quotation (*Molīpa*).

First, he mentions, till *au* (*aukāra iṇuvāyp*), totally 12 sounds (*paṇṇireḷuttum*) then he categorized them as a vowel (*uyir*) and the last he quotes as "Molīpa", this is not his owns statement, he followed standard alphabet order. Till *au* (last vowel), *aukāra iṇuvāyp* it means all the vowels (starting with *a* and ending with *au*), this system of description found in Tolkāppiyam only. Tolkāppiyar used this method both in the list of vowels (Tol.E|u.8) and the list of consonants (Tol.E|u.9).

3. Manner of articulation of vowels (Tol.E[u.84-88)

Name of the sounds (*a ā / i ī e ē ai / u ū o ō au*)Total number of the sounds (*āyiraṇṭu / aintum*)Manner of articulation (*aṅkappu / aṅpal mutalnā viḷimpuural / italkuvivu*)

Tolkāppiyar used the same method in the description of the manner of articulation of all vowels. First, he mentions the sounds, then count them in number and the last define manner of articulation of vowels.

Tolkāppiyar followed the standard method in the description of vowels. He deliberates the vowels in following order: List of sounds, numbering, and explanation. Both of the classification of vowels and list of vowels are not mentioned from his own knowledge, it's already had in Tamil linguistic tradition, he mention it clearly as “*eṇpa*”, “*Molīpa*”. Tolkāppiyar define the manner of articulation of vowels individually.

Tolkāppiyar's classification of vowels

In Tolkāppiyar list of secondary sounds²⁴ *shortened i* (*kurriyal-ikaram*) and *shortened u* (*kurriyal-ukaram*) both secondary vowels.²⁵ Tolkāppiyar does not mention these two in vowel list and not divide the vowels as primary and secondary.

Table 2.3 Tolkāppiyar's classification of vowels and diphthongs

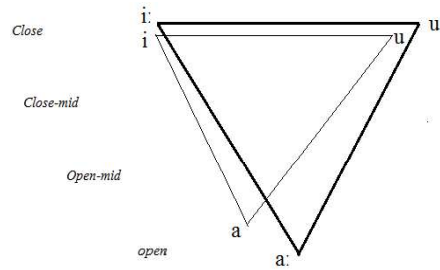
Un-identifiable classification	Identifiable classification	Sounds	Total
Primary vowels	Short	<i>a, i, u, e, o</i>	5
	Long	<i>ā, ī, ū, ē, ō</i>	5
	Diphthong	<i>ai, au</i>	2
Secondary vowels	<i>shortened i,</i> <i>shortened u</i>	<i>i, u</i>	2

Tolkāppiyar's observation of short and long vowels is insufficiency. He describes the differences between short and long vowels by duration only, does not define basis tongue position. Modern phoneticians consider tongue position is main role for vowel classification; it will be discussed in the chart 2.6.

Chart 2.6 Variances among short and long vowels in tongue position

²⁴ Tolkāppiyam 2.

²⁵ Subrahmanya Sastri P.S.1934. *History of Grammatical Theories in Tamil and their relation to the Grammatical Literature in Sanskrit*, p.18 (Reprint:1997)



Tolkāppiyar's theory of vowel classification

Tolkāppiyar classifies the vowels as short, long and diphthong basis time duration only. He gives *ōraḷapu* (one māttirai) for short vowels and *īraḷapu* (two māttirai) for long vowels. Tolkāppiyar basically uses the short vowels for vowel classification. It is shown in following statements, “*akra ikara m-aikāramākum*” [a+i=ai] and “*akara ukara m-aukāramākum*” [a+u=au] (Tol.Eu.54,55). First, he defines the short vowels then long and the last diphthongs (Tol.Eu.3,85,86,87).

Tamil vowels in Tolkāppiyar phonetics framework

Tolkāppiyar does not define all manners of the vowels. He defines only the lip position for *a* and *ā*, does not mention other manners of the sounds. For *i*, *ī*, *e*, *ē* and *ai* he defines only the tongue position does not mention lip position and he defines only lip position for *u*, *ū*, *o*, *ō* and *au*. Tolkāppiyar mentions only the major roles of the manners in the vowel description. The manner of mouth open (*aṅkappu*) is a main role of the production of *a* and *ā*, the edges of the front of the tongue touch the teeth ridge (*aṅṅal mutalnā viḷimpuṅṅal*) is a main role of the production of *i*, *ī*, *e*, *ē* and *ai* and the manner of rounding the lips (*italkuvivu*) is a major role of the production of *u*, *ū*, *o*, *ō* and *au*. Tolkāppiyar mentions only the major role of the manners of the vowels and he also considers all the other manners are additionally. It's displayed the table 2.4. Sībawayh also used the same technique (he describes only the major role of manners of the vowels) in the speech production of Arabic vowels in Al-Kitāb.

Table 2.4 Tamil vowels in Tolkāppiyar phonetics framework

Serial No.	Tamil Symbols	IPA Equivalents	Phonetic Values	Tongue position						Lip position			Duration		Diphthong
				Front	Back	Low	High	Lax	Tense	Open	Close	Round	Short	Long	
1	அ	a	a	-	-	+	-	+	-	+	-	-	+	-	-
2	ஆ	a:	ā	-	-	+	-	+	-	+	-	-	-	+	-
3	இ	i	i	+	-	-	+	-	-	-	+	-	+	-	-
4	ஈ	i:	ī	+	-	-	+	-	-	-	+	-	-	+	-
5	உ	u	u	-	+	-	-	-	+	-	-	+	+	-	-
6	ஊ	u:	ū	-	+	-	-	-	+	-	-	+	-	+	-
7	எ	e	e	-	-	-	+	-	-	-	+	-	+	-	-
8	ஏ	e:	ē	-	-	-	+	-	-	-	+	-	-	+	-
9	ஐ	ai	ai	-	-	-	-	-	-	-	+	-	-	+	+
10	ஓ	o	o	-	-	-	-	-	+	-	-	+	+	-	-
11	ஔ	o:	ō	-	-	-	-	-	+	-	-	+	-	+	-

Tolkāppiyar does not mention these features (manners) of the sounds.

Tolkāppiyar's treatment of consonants

Tolkāppiyar arranges the points of articulation of eighteen consonants in ten places. He lists the eighteen consonants as “*nakara iruvayp patineṅ eluttum meyyeṅa molipa*” (Tol.E[u.9) and describes their points and manners of articulation as following:

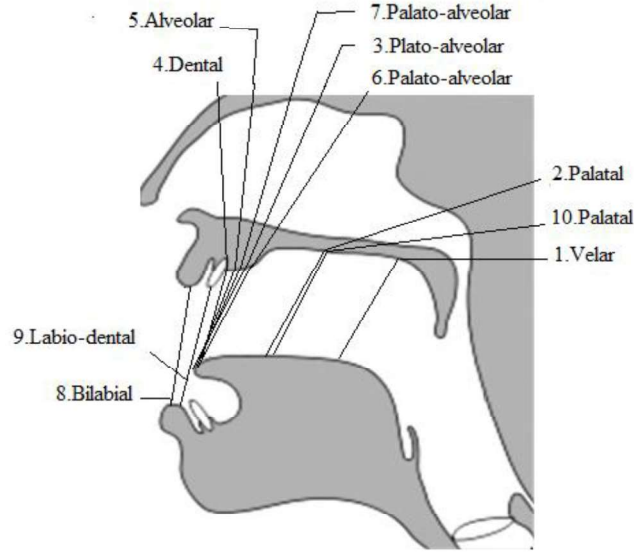


Figure 2.1. Tolkāppiyar arrangement of points of articulation of Tamil consonants from soft palate to lips

1. The back of the tongue and the palate, (velar) [k, ŋ]
kakāra ṅakāram mutalnā aṇṇam - Tol.E|u.89
2. The middle of the tongue and the palate, (palatal) [c, ṅ]
caḱāra ṅakāram iṭainā aṇṇam - Tol.E|u.90
3. The tip of the tongue and the palate, (velarized alveolar) [ṭ, ṇ]
ṭakāra ṅakāram nuṇinā aṇṇam - Tol.E|u.91

In the description of these six sounds (k ṅ, c ṅ, ṭ ṇ), Tolkāppiyar mentions only the points of articulation that, *mutalnā - aṇṇam*, *iṭainā - aṇṇam* and *nuṇinā - aṇṇam* does not mention the manners of articulation. He divides the perimeter into two as lower (tongue) and upper (palate), first he, defines the lower perimeter as *mutalnā*, *iṭainā* and *nuṇinā* and then he defines the upper perimeter as *aṇṇam*. Tolkāppiyar does not divide the upper perimeter (*aṇṇam*) openly. Iḷampūraṇar and Nacciṇārkkīṇiyar comments that, the term *mutal* (root) is covered tongue (dorsum) and palate (soft palate/velum). Pavananti muṇivar and Vaittiyanāta tēcīkar are followed Tolkāppiyar, but Muttuvīriya upāttiyāyar gives both the points and manners of articulation. He provides the manner of articulation each two sounds, they:

- i. The back of the tongue **presses** the palate, (velar) [k, ŋ]
aṭinā vaṭiyaṇa m-aḷuttak ka ṅa varum -Mu.vī.47
- ii. The middle of the tongue **tight** the palate, (palatal) [c, ṅ]
iṭainā viṭaiyaṇa m-iṇukkac caṅavelum -Mu.vī.48
- iii. The tip of the tongue **touch** the palate, (velarized alveolar) [ṭ, ṇ]
nuṇinā nuṇiyaṇa nōkka ṭaṇavarum - Mu.vī.49

He uses the terms *press*, *tight* and *touch* for the manners of *k ṅ*, *c ṅ* and *ṭ ṇ*. All the other grammarians are used the term *kaṭainā* for back of the tongue, but Muttuvīra upāttiyāyar uses the term *aṭinā*, this is synonyms of *kaṭainā*.

4. *t* (and) *n*, they are easily produced by the tip of the tongue spread out, (its) body touching (and) striking the place adjacent to the teeth (where they) join the palate.

aṇṇam naṇṇiya palmutal maruṅkiṇ
nānuṇi parantu meyuṛa vorrat
tāmiṇitu piṛakkum takāra nakāram - Tol.El.93

5. The tip of the tongue is raised and strikes the palate, (alveolar) [r, ṇ]

aṇari nuṇinā aṇṇam orra
raḱḱāṇ naḱḱāṇ āyiraṇṭum piṛakkum - Tol.El.94

6. The tip of the tongue is raised and rubs the palate, (alveolar) [r, ḷ]

nuṇinā aṇari aṇṇam varuṭa
raḱāra ḷaḱāram āyiraṇṭum piṛakkum -Tol.El.95

7. The edge of the tongue swelling and coming into contact with the adjacent the teeth, so that (it respectively) strikes and rubs the palate at that place, (alveolar) [l, ḷ]

nā viḷimpu vīṅki yaṇpal mutaluṛa
āvayin aṇṇam orravum varuṭavum
lakāra ḷaḱāram āyiraṇṭum piṛakkum - Tol.El.96

8. The contact of the lips, (bilabial) [p, m]

itaḷiyaintu piṛakkum pakāra makāram Tol.El.97

9. The contact of the teeth and lips, (labio-dental) [v]

pallitaḷ iyaiya vakāram piṛakkum - Tol.El.98

10. The air arising in the throat reaches the palate and the place is choked up, (palatal) [y]

aṇṇam cērnta miṭarreḷu vaḷiicai
kaṇṇuṛ raṭaiya yakāram piṛakkum - Tol.El.

Tolkāppiyar describes both the points and manners of articulation in the same nūrpā/sūtra, that *aṇari nuṇinā aṇṇam oṛra raḷkāṇ naḷkāṇ āyiraṇṭum piṛakkum* (Tol.Eu.94). Here, *nuṇinā* (tip of the tongue) and *aṇṇam* (palate) are points of articulation, *aṇari* (raised) and *oṛra* (strikes) are the manners of articulation. All the other grammarians are followed the same method. Tolkāppiyar does not define the places basis stops, nasals, fricatives, trills etc. He mixes the stops with nasals in the same place of articulation as, [k ṇ], [c ṇ̄], [t ṇ], [t n], [r ṇ], [p m], first he mention the stops and then nasals.

Table 2.5 Tolkāppiyar phonetic table

S.no. of Points of Articulation	Lower perimeters	Tamil symbols	IPA Equivalents	Phonetic values	Upper perimeters
1	Tongue: lower than	க, ன	k, ŋ	k, ṇ	Palate: pre-farthest section
2	Tongue: mid-section	ச, ஞ	c, ɲ	c, ṇ̄	Palate: mid-section
3	Tongue: tip	ட, ண	ɖ, n	ɖ, ṇ	Palate: front section
4	Tongue: expansion of back section	த, ந	ɖ, ɳ	t, n	Palate: above the incisors
5	Tongue: back section	ட, ண	d, ŋ	r, ṇ	Palate: front section
6	Tongue: stroking of tip	ர, ள	r, ɻ	r, ɭ	Palate: front section
7	Tongue: blade	ல, ள	l, ɭ	l, ɭ	Palate: front section
8	Lip: lower	ப, ம	p, m	p, m	Lip: upper
9	Lip: lower	வ	v	v	Incisor : tip
10	Tongue: mid-section	ய	y	y	Tongue: mid-section

Tolkāppiyar describes the speech production of eighteen consonants in ten nūrpās/sūtras (Tol.Eu.89-99), he allots one place per nūrpā. Pavananti muṇivar describes the points and manners of articulation of eighteen consonants in eight nūrpās (Naṇ.79-86), Vaittiyanāta tēcīkar describes speech production of eighteen consonants in one nūrpā (Ila.vi.12) and Muttuvīra upāttiyāyar describes the points and manners of articulation of eighteen consonants in eleven nūrpās (Mu.vī.42-57), he defines the separate place for /.

Tamil consonants in Tolkāppiyar phonetics framework

Tolkāppiyar define the points of articulation of the consonants from the soft palate (velum) to lips. He does not mention sequentially. First four points he mention orderly from soft palate to teeth ridge that, soft palate [k ṇ], mid palate [c ṇ̄], hard palate [t ṇ] and teeth ridge [t n]. Then he goes to opposite order, back of the teeth ridge [r ṇ] and front of the mid palate [r ɭ]. Then he comes to right order, teeth ridge [l ɭ], lips (bilabial) [p m] and lips (labiodental) [v]. The last he goes back to soft palate [y].

Table 2.6 Tamil Consonants in Tolkāppiyar Phonetics Framework

Place →	<u>Bilabial</u>		<u>Labiodental</u>		<u>Dental</u>		<u>Alveolar</u>		<u>Post alveolar</u>		<u>Retroflex</u>		<u>Palatal</u>		<u>Velar</u>		<u>Uvular</u>		<u>Pharyngeal</u>		<u>Glottal</u>		
↓ Manner																							
Stop	p				ɸ	t					ʈ	c	k										
Nasal		m			ɸ̃	n					ɻ	ɟ	ŋ										
Trill							r																
Flap																							
Fricative				v																			
Lateral Fricative																							
Approximant												ɻ	j										
Lateral approximant							l					ɻ											

Unvoiced

Voiced

Tolkāppiyar's order of the treatment of consonants

Tolkāppiyar mentions the vowels are same order in all places of *Eḷuttatikāram*, but he does not follow the same in the order of consonants. He followed the two-alphabet system in the description of consonants, they are:

1. Standard alphabet order
2. Phonetic alphabet order (basis points of articulation)

1. Standard alphabet order:

Tolkāppiyar mostly mentions the consonants in the standard alphabet order in following *nūṟpās* of *Eḷuttatikāram*: 9, 24-30, 48, 49, 61, 70, 143, 144, 146, 149, 150, 152, 170, 182, 203, 205, 206, 297, 478, 481.

2. Phonetic alphabet order (basis points of articulation):

Tolkāppiyar does not follow the standard alphabet order in *piṟappiyal*. He describes the points of articulation of the consonants in the phonetic alphabet order (basis points of articulation) in following *nūṟpās*: 89-91, 93-99 and 51 in *moḷimarapu*. He does not declare any explanation for the phonetic alphabet order, like standard alphabet order as “*akaram mutal ṅakara iṟuvāy*” (Tol.Eḷu.1). This phonetic alphabet order is starting from *k* and ending with *y*. Tolkāppiyar created the order newly basis points of articulation of the consonants. Sībawayh makes the phonetic alphabet order (basis points of articulation) in Arabic and he used frequently in the chapter of articulatory phonetics (Ch.565) of *Al-Kitāb*.

Table 2.7 Dissimilarities between the standard alphabet order and Tolkāppiyar's phonetic alphabet order

S. no.	Standard	alphabet order	Tolkāppiyar's phonetic	alphabet order
1	க	k	க	k
2	ங	ṅ	ங	ṅ
3	ச	c	ச	c
4	ஞ	ñ	ஞ	ñ
5	ட	ṭ	ட	ṭ
6	ண	ṇ	ண	ṇ
7	த	t	த	t
8	ந	n	ந	n
9	ப	p	ப	p
10	ம	m	ம்	m
11	ய	y	ர்	r
12	ர	r	ர்	r
13	ல	l	ல்	l
14	வ	v	ர்	r
15	ழ	ḷ	ப	p
16	ழ	ḷ	ம்	m
17	ஶ	ṣ	வ	v
18	ஷ	ṣ	ய	y

◇ Dissimilarity of the order

The order of the consonants of other Tamil grammarians

All the Tamil grammarians have generally followed the standard alphabet order. Pavananti muṇivar, Vaittiyanāta tēcīkar and Muttuvīra upāttiyāyar are transformed the places of *l*, *v*, *ḷ* and *ḷ* only. They are arranged these sounds in the following order: *l*, *l*, *l*, and *v*,²⁶ the order of *ḷ*, *l*, and *ḷ* is similar to Tolkāppiyar phonetic alphabet order. In the descriptions of points of articulation, all the grammarians are placed the points of *r* and *ṇ* at the last in the order except Tolkāppiyar. Tolkāppiyar explain the *r* and *ṇ* in the middle of the order, after *t* and *n*.

Tolkāppiyar's theory of the treatment of consonants

Tolkāppiyar treats the consonants analytically, divides his description in to three folders that list of consonants, classification of consonants, articulatory processes of consonants.

1. List of consonants (Tol.E[u.9])

Last sound (*ṇ*) of the consonants (*ṇakāra*)

Total number of sounds (*paṭiṇeṇ eluttum*)

²⁶ *Naṇṇūl* 83, 84 and 85, *Ilakkaṇaviḷakkam* 12 and *Muttuvīriyam* 53, 54, 55 and 56.

Category of the sound (*meyyēṇa*)

Quotation (*Molīpa*)

2. Classification of consonants (Tol.El.19, 20 and 21)

Category of the sounds (*Valleluttu / Melleluttu / Itaiyeluttu*)

Name of the sounds (*k c t t p r / ṅ ṅ ṅ n m ṅ / y r l v l l*)

Tolkāppiyar called all the consonants in the form of vowel consonants as *ka, ca* etc.

3. Articulatory processes of the consonants (Tol.El.89-100)

Both of the stops and nasal are mentioned in the same points (*k ṅ / c ṅ / t ṅ / t n / r ṅ / p m*)

Order of articulator:

First, he mentions active articulator, then passive articulator.

(*Mutal nā aṇṇam / Itainā aṇṇam / Nuṇinā aṇṇam*)

Order of points of articulation: From soft palate to lips

Phonetic alphabet order: Tolkāppiyar define the points of articulation of consonants in phonetic alphabet order basis points of articulation.

Tolkāppiyar's treatment of the secondary sounds [*cārpeluttukka!*] / Allophones

Tolkāppiyar mention the allophones as three that, *ī* (*Kuṟṟiyalikaram*), *ū* (*Kuṟṟiyalukaram*) and *ak* (*Āyṭam*).²⁷

He says about the points of articulation of allophones (*cārpeluttukka!*), “they are company of the primary sounds, not for them separate points of articulation,”²⁸ but he does not count the allophones with primary sounds.

Classification of allophones of Tolkāppiyar and other Tamil grammarians

The classification of allophones differs by the grammarians and the observation of allophones is not standardized. Tolkāppiyar mention only three allophones and other latter grammarians gives more than 300. They categorized the allophones as, *Uyirmey*, *Āyṭam*, *Uyiralapu*, *Orralapu*, *Kuṟṟiyalukaram*, *Kuṟṟiyalikaram*, *Aikāralkuṟṟukkam*, *Aukāral kuṟṟukkam*, *Makarakuṟṟukkam*, *Āyṭakuṟṟukkam*. This classification of allophones uses the first in *naṇṇul*.

Table 2.8 Total number of secondary sounds by Tamil grammarians²⁹

Period	Grammarian	Categories of secondary sounds (<i>cārpe<u>l</u>uttukka!</i>)									Total
		<i>Uyirmey</i>	<i>Āyṭam</i>	<i>Uyira<u>l</u>apu</i>	<i>Orra<u>l</u>apu</i>	<i>Kuṟṟiyalikaram</i>	<i>Kuṟṟiyalukaram</i>	<i>Aikāra<u>l</u>kuṟṟukkam</i>	<i>Aukāra<u>l</u> kuṟṟukkam</i>	<i>Makarakuṟṟukkam</i>	

²⁷ Tolkāppiyam 2.

²⁸ Ibid.101.

²⁹ Kō.Kiruṭṭiṇamūrṭti. Tolkāppiya āyviṇ varalāru, 1990, p.392.

BC. 300	Tolkāppiyar		1			1						3
AD. 1100	Puttamittiraṇār			7		1		1				11
AD. 1200	Kuṇavīrapaṇṭitar	216		7	11	1		1		1		239
AD. 1300	Pavananti muṇivar	216	8	21	42	37		36		3		369
AD. 1700	Vaittiyānāta tēcikar	216	1	7	11	1		1		1		241
AD. 1700	Vīramāmuṇivar	216	8	21	42	37		36		3		367
AD. 1900	Muttuvīra upāttiyāyar	216	1									217

Tolkāppiyar's theory of treatment of allophones

Tolkāppiyar mention the three allophones after the lists of thirty primary sounds. He describes the allophone in following order:

Category of the sounds (*Cārntuvaral*) (Tol.El.1)

Total number of the sounds (*Mūṇru*) (Tol.El.1)

Name of the sounds (*Kurriyalikaram, Kurriyalukaram, Āytam*) (Tol.El.2)

Duration of allophones (*araiyaḷapu*) (Tol.El.12)

Category of the sounds (*Cārntuvaral*) and a total number of the sounds (*Mūṇru*) mention in the first nūrpa, then he mentions the names in the second nūrpa and the duration of allophones in the twelfth nūrpa.

Tolkāppiyar's order of the speech sounds

He classifies the speech sounds clear as primary and secondary. In the primary sounds, first he explains the manners of articulation of the twelve vowels and then he describes the details of points and manners of articulation of the eighteen consonants and the last, he defines the points and manners of articulation of three secondary sounds. All the later grammarians have followed this method of description (vowel-consonant-allophone). Tolkāppiyar followed this order in the list of sounds (Tol.El.1), time duration (Tol.El.3,4,11), classification of sounds (Tol.El.8,9) and articulatory processes of the sounds (Tol.El.85-101), but he change this order at the common features of the speech production only. Here, he mentions the first, common features of the speech production for consonants (Tol.El.83) and then vowels (Tol.El.84). Sībawayh describes the Arabic sounds in opposite order, he also classified the speech sounds as primary and secondary, but he does not make the separate division for the primary sounds as vowels and consonants like Tolkāppiyar. So he discusses the first, consonants then secondary sounds and the last vowels (consonant-allophone-vowel).

Tolkāppiyar describes the speech sounds not only in *Pirappiyal*, he mentioned some features of the sounds in *nūnmarapu* also. They are:

Primary and secondary sounds

Thirteen original sounds (12 vowels and 18 consonants) with standard alphabet order (Tol.El.1)

Name of three secondary sounds (*cārpeḷuttukkal*) (Tol.El.2)

Vowels:

- Name of five short vowels (Tol.E|u.3)
- Name of seven long vowels (Tol.E|u.4)
- Total numbers (12) of vowels (Tol.E|u.8)
- Quantity of vowels (Tol.E|u.7)
- Extra lengthening of vowels (Tol.E|u.5,6)
- Extra lengthening of sounds in music (Tol.E|u.33)

Consonants:

- Total number (18) of consonants (Tol.E|u.9)
- Quantity of consonants (Tol.E|u.11)
- Quantity of secondary sounds (Tol.E|u.12)
- Quantity of shortened *m* (Tol.E|u.13)
- Mutual linear order of vowels and consonants (Tol.E|u.18)

Vowel consonants:

- Quantity of vowel (vocalized) consonants (Tol.E|u.10)

Classification of the consonants:

- Stop sounds: k, c, ṭ, t, p, r. (Tol.E|u.19)
- Nasal sounds: ṅ, ñ, ṇ, n, m, ṇ. (Tol.E|u.20)
- Semi vowels: y, r, l, v, ḷ, ḷ. (Tol.E|u.21)

Grapheme of the sounds:

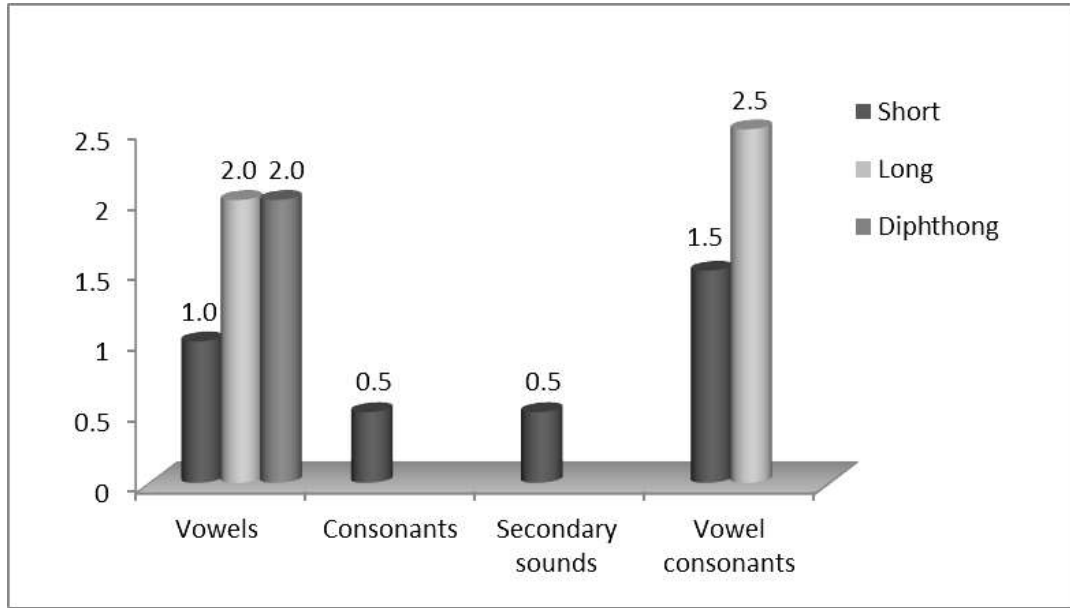
- Grapheme of the shortened *m* (Tol.E|u.14)
- Grapheme of the consonants (Tol.E|u.15)
- Grapheme of *e* and *o* (Tol.E|u.16)
- Graphic representation of vowel consonants (Tol.E|u.17)

Tolkāppiyar classification of the speech sounds basis time duration (māttirai)

Tolkāppiyar defines the duration of the sounds that, *one māttirai* for short vowels, *two māttirai* for long vowels, *half māttirai* for consonants and allophones. He does not create separate category for diphthongs basis time duration, mixing with the long vowels. Tolkāppiyar's observation of *māttirai*, gives some links between Tamil and Sanskrit. Nūrpās 5, 33, 83, 102 and 103 evidently displays that, Tolkāppiyar has studied Vedic (Śikṣā and Prātiśakhyas) and musical texts of Sanskrit.³⁰

³⁰ Subrahmanya Sastri P.S. *History of Grammatical Theories in Tamil and their relation to the Grammatical Literature in Sanskrit*, 1934 (reprint 1997), p.10. & Krishnaswamy Nachimuthu. *Negotiating Tamil-Sanskrit Contacts: Engagements by Tamil Grammarians*, 2009, p.3.

Diagram 2.1 Tolkāppiyar's classification of sounds basis time duration (*māttirai*)



Tolkāppiyar's definition of *māttirai*:

One *māttirai* is the time taken by a wink of the eyes (or) a snap of the fingers.

kaṇṇimai noṭi eṇa avvē māttirai
nunṇitiṅ uṇarntōr kaṇṭa vārē - Tol.Eu.7

Tolkāppiyar classifies the speech sounds in acoustic level (*māttirai*) that, **vowels**: short and long, **consonants**, **allophones**, and **vowel consonants**.

Conclusion

Tolkāppiyar treatise the phonetics authentically, it's evidently displayed in Panamparanar's preface (*pāyiram*) of Tolkāppiyam. "Produced the phonemic features with no disorder" (*Mayaṅkā marapiṅ eḷuttumurai kāṭṭi*). Tolkāppiyar mention briefly the total speech sounds of Tamil in the first nūrpa "*Eḷuttenap paṭupa / Akaram mutal nakaram iruvāy / Muppaḥtu eṇpa / Cārntuvaral marapiṅ muṇṇralaṅkaṭaiyē*" and he classifies them in to two phones and allophones. Then he describes the phonetic processes of the sounds in following order: Name of allophones (Tol.Eu.2); Classification of vowels basis time duration (Tol.Eu.3): Short and Long; Classification of primary sounds (Tol.Eu.8 and 9) Vowels and Consonants; Time duration of consonants and allophones (Tol.Eu.11 and 12); Classification of consonants (Tol.Eu.18, 19 and 20): Stops, Nasals and Trill, fricative etc.; Definition of diphthong (Tol.Eu.54 and 55).

Then he describes the points and manners of articulation are systematical. Before the entry to the description of the points and manners of articulation of the sounds, he mentions the common features of the speech production. In the beginning of *pirappiyal*, first two nūrpa (Tol.Eu.83 and 84) describes the common features of the speech production, first nūrpa explains the common features of the speech production only for consonants and the next nūrpa defines the common sense of the speech production of vowels. Tolkāppiyar says the producer of the vowels as, "The air passing through the throat" (Tol.Eu.84). All the other grammarians are not mentioning this sense of vowels description. Then he describes the articulatory processes of the sounds orderly, vowels, consonants, and allophones.

In the description of vowels, first, Tolkāppiyar divides the vowels (Tol.Eu.3 and 4) as short and long

and then he mentions the list of vowels (Tol.El.8). He changes to this order in the description of consonants. Here, first he mentions the list of consonants (Tol.El.9) and then he divides the consonants (Tol.El.19,20 and 21) as stop (*Valleluttu*) nasal (*Melleluttu*) and others (*Ilaiyeluttu*). He counts the sounds in number at vowel classification only, he does not count the sounds in the classification of consonants. The list of sounds and classification are taken from the old Tamil linguistic tradition, but points and manners of articulation are defined from Tolkāppiyar's own knowledge. Tolkāppiyar not only says the points and manners of articulation, but he also counting the sounds in number as, *āyiraṅtu*, *appāl aintum* etc. This is very useful to verify the sounds. All the later grammarians are not counting the sounds in number.

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