

**A PHONETIC AND ACOUSTIC STUDY OF DENTO-ALVEOLAR
PHONEMES IN BALTI**

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ABSTRACT

The present study attempts to classify consonants (Dento-Alveolar phonemes sounds only) of Balti language which is spoken in Baltistan region of Gilgit-Baltistan of Pakistan. The study selects Balti language because it is one of the lesser known languages in Pakistan and no significant work on the sounds and sound system of Balti language has ever been conducted. In order to classify Balti consonants, 120 different words were selected from different Balti books. Acoustic analysis of Balti consonants have been checked in order to show their physical features by using the software PRAAT. To record the samples of different Balti consonant sounds, the researcher selected 20 native Balti speakers between the age group of 16 to 35 studying in the Govt College (boys) Model Town and University of Management and Technology, Lahore Pakistan. The physical features of the sound samples of Balti native speakers were shown in the form of spectrograms for each sound. Acoustic analyses of Balti consonant sounds demonstrate that there are 5 Dento-Alveolar phonemes in Balti language.

Keywords: Acoustic Analysis, Description, Classification, Consonants, Dento-alveolar, Spectrogram

INTRODUCTION

The legendary land of Baltistan is hemmed in on all sides by stupendous mountain ranges which stand like white giants of unproportioned height. Nowhere in the world is clustered so many high peak within such a small area as in Baltistan. The history of this area is rich and prosperous because of its cultural, ethical and linguistically richness and prosperity in the past. Most of the people of the area speak Balti language. Balti is a member of Sino-Bodic of the Himalish group which originated from the Tibeto-Burman of Sino-Tibetan family of language which is the second largest family of the world in term of the number of speakers. English and the other European language s belong to this language family. The Sino-Bodic family of languages is link with the most ancient language that is Altaic: Turkic Mongolian and Tungusic. Balti is a reminiscent of the one of the most ancient civilizations of the Baot or Bonpo (the followers of Bon) ethnic group and Bon Shamanism religion. Tonpa an influential with strong minded person was the great ruler of the Tibetan mesa at that time and the great Tibet was known as the Ol-mo Lunring. Ol-mo Lung-ringwas situated in the west of Tibet, where Balti was officially religious language and language of trade and commerce and flourished and modified from time to time. At that time the students from the different areas of this part great Tibet (Baltistan) would go to the educational centres or in other words schools for getting education. However, the separation of the great Tibetan empire caused this devastating \process of learning and teaching systems to meet a obnoxious end. The evolutionary period of Tibetan script started from the early seventh century. Song Seen Zghampo(617-650A.D) the then ruler of Tibet sent one of Annals of Human and Social Sciences (AHSS)July-September, 2022 Volume 3, Issue 2315his ministers AnoThonmi Bu (son of tall women)to India to formulate script and grammar for the Tibetan language. Thonmi,also known in the history as Sambota, learnt Sanskrit language

from Tamze Li Chun. Sambota came back to Lhasa after learning the writing skills and grammar, and he projected two versions of scripts those are known as Ochan or U chan and Thaik for the Tibetan language using the letters of Sanskrit language. The Thaik version has extinct while Ochan is the existing now and used in writing purpose in Ladakh and its surrounding areas Sambota was considered as the first person who wrote the first ever grammar on Tibetan language, as a result Balti language became very popular Language of that time, but after the arrival of Islam in this region in 14th century A.D the religious relationship of Baltistan was disconnected from other parts of the great Tibet. The people of this region embraced Islam on the hand of Hazrat Ameer Kabeer Syed Ali Hamdani (R.A) and Hazrat Mir Shams-ud-Deen Muhammad Iraqi (R.A) and after separating Islam, the religious terminologies of Bon and Buddhism were replaced by the Islamic terminologies of Persian and Arabic languages. Consequently, the Agay (the original Balti script) became passive in Baltistan region and Persian written script was adopted for writing their poetries and other literary purposes that is continued till today.

Literature Review If one observes the number of people speaking Balti language and has a cursory look on the size of the geographic region they occupy, we find no special effort on the grammar and phonology has been made and not much is written about this language. The phonology has been slightly discussed. The initial work in this regard is observed in the works of Austen. In 1866, Austen, the famous surveyor of the Karakoram Mountains, became the first European to publish a vocabulary of Balti. Keeping in view the works of Austen, has also included somewhat more precise, though small, vocabulary and some notes on the grammar of both Balti and Purki in Volume III of his book Linguistic Survey of India. Bailey added a more detailed grammatical outline and vocabulary of Purki in 1915. In addition to all these contributors in 1934, Red published the most extensive grammar of Balti to date, along with a vocabulary of well over 2,000 words. Some forty years later, Rangan added a phonology and grammar of Purki (Dialect of Balti) in 1979. From the point of view regarding phonetic notation, Rangan's contribution is the most accurate work, as his predecessors were mostly unaware of the nature of certain sounds found in Balti and Purki, particularly the palatal nasal [ɲ] which they variously recorded as [n], [K], [ny], or [Ky] (Backstrom, 1992). H.A Jaschke relates that many words of Balti language were original words derived from the Hindi language therefore; he assumed that many Balti sounds are similar to Hindi language sounds. In the same book he mentioned 30 Balti consonant letters and 4 diacritics symbols for Balti vowel sounds (Jaschke, 1983). Jaschke did not prove these sounds based on scientific way instead; he considered the letters as sound.

Material and Methods The details of the methodology are given under the relevant sub-headings.

Participants In order to conduct this particular study the researcher selected 20 native Balti speakers between the age group of 16 to 35 studying in the Govt College (boys) Model Town and University of Management and Technology, Lahore Pakistan.

Procedure In order to classify Balti consonants, 120 different words were selected from different Balti books. Acoustic analysis of Balti consonants have been checked in order to show their physical features by using the software PRAAT.

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Discussion To describe the place of articulation of each sound, a diagram of every individual sound is made. On the other hand, spectrogram of each sound has also been made which indicates the manner of articulation, i.e., fricatives, voiced, voiceless, aspirated and un-aspirated features of each sound. The voiced sound is also shown in the diagram with the help of this mark (). Minimal pairs were made to check the existence of different sounds. The observation of researcher has been discussed and the data was analyzed with the help of the diagram and spectrogram mentioned with each sound. Finally, the findings of this study have been mentioned at the end of data analysis.

4.8 Minimal pairs for ɟ /tʃ/ ɟ /dʒ/ and ɟʰ/

The existence of /tʃ/, /dʒ/ and ɟʰ/ sounds in Balti language has been checked through the following minimal pairs.

Minimal pairs	Transcription	Meaning
Cha	/tʃa /	tea
Janda	/dʒnda/	pocket
Ch ^h an	/tʃ ^h n /	corner

Finding

The above minimal pairs show that the phonemes /tʃ/, /dʒ/ and /tʃ^h/ exist in Balti language. The minimal pairs show that aspiration does not mark an allophonic contrast as it does in English; instead, aspiration marks phonemic contrast in Balti.

Observation on phoneme /tʃ/ of the Balti language by the researcher is shown in:

Diagram.1 and Table.1



Diagram 1

Table 1: Description of phoneme /tʃ/ in Balti language

IPA symbol	/tʃ/
Place of articulation	Palato-Alveolar
Manner of articulation	Affricate
Voicing	Voiceless
As-un-aspirated	un-aspirated
Perso-Arabic letter	چ

/tʃ/ (Voiceless Palato-Alveolar)

Analysis

The phoneme /tʃ/ is a voiceless un-aspirated palato-alveolar affricate sound in Balti language. In the articulation of this phoneme the front of the tongue moves towards the palate, as shown in diagram 1, stops the air flow and is followed by sudden release of the airstream with hissing sound, when the tongue is removed from the hard palate as shown in the spectrogram 1. The results of minimal pairs also prove that in Balti there are two different phonemes for the same English phoneme. Aspirated and un-aspirated, i.e., /chin/ un-aspirated / چ / sound (what). Moreover, no vibration has been observed during acoustic analysis of this sound through Praat shown in spectrogram 1. Therefore, this is a voiceless sound.

The spectrogram of the Balti phoneme /tʃ/

Observation on phoneme /dʒ/ of the Balti language by the researcher is shown in: **Diagram 2 and Table 2.**

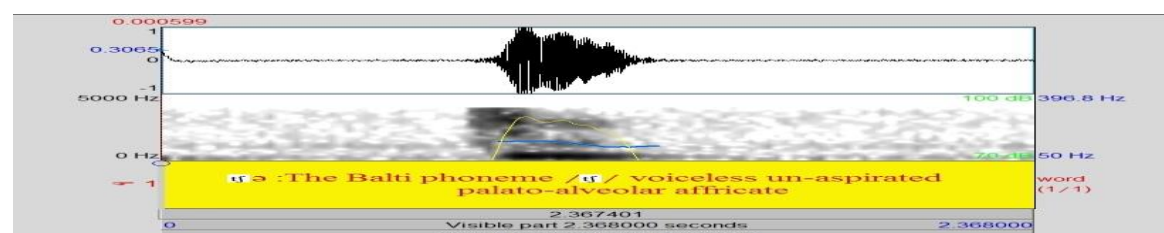




Diagram 2

Table 2: Description of phoneme / $dʒ$ / in Balti language

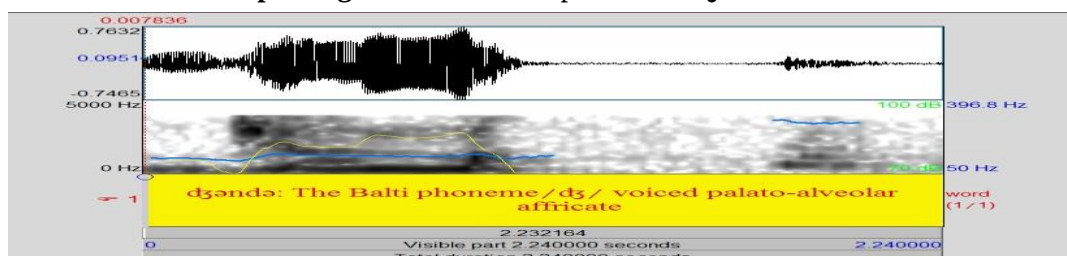
IPA symbol	/ $dʒ$ /
Place of articulation	Palato-Alveolar
Manner of articulation	Affricate
Voicing	Voiced
As-un-aspirated	un-aspirated
Perso-Arabic letter	ج

ج / $dʒ$ / (Voiced Palato-Alevolar)

ANALYSIS

The phoneme / $dʒ$ / is a voiced un-aspirated palato-alveolar affricate sound in Balti language. In the articulation of this phoneme, the front of the tongue touches the back of the alveolar ridge as shown in the diagram 2. The air pressure is increased and when the tongue is removed from the hard palate it produces a hissing sound (see in the spectrogram 2. Moreover, strong vibration has been observed during acoustic analysis of this sound through Praat computer software shown in the spectrogram 2. Therefore, this is a voiced sound.

The spectrogram 2: The Balti phoneme / $dʒ$ /



Observation on phoneme / $tʃ^h$ / of the Balti language by the researcher is shown in:

Diagram 3 and Table 3.



Diagram 3

Table 3: Description of phoneme / $tʃ^h$ / in Balti language

IPA symbol	/ $tʃ^h$ /
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Place of articulation	Palato-Alveolar
Manner of articulation	Affricate
Voicing	Voiceless
As-un-aspirated	un-aspirated
Perso-Arabic letter	چ

/tʃ^h/ (Voiceless Palato-Alveolar)

ANALYSIS

The phoneme /tʃ^h/ is a voiceless aspirated palate-alveolar affricate in Balti language. To produce this sound the front of the tongue touches against the back of alveolar ridge shown in the diagram 3. During the production of this sound in Balti the air stops for a short while followed by sudden release of the air with hissing sound. It is produced with aspiration and without aspiration in Balti. The result of minimal pairs also prove that in Balti, there are two different phonemes for the same English phoneme, one is aspirated /tʃ^hin/ (mat) and the other is un-aspirated, i.e., /tʃin/ (what is). No vibration has been observed during acoustic analysis of this sound through Praat computer software shown in the spectrogram 3. Therefore, this phoneme is a voiceless sound.

The spectrogram 3: The Balti phoneme /tʃ^h/

Minimal pairs for /ʃ/ and /ʒ/ sounds

The existence of phonemes /ʃ/ and /ʒ/ in Balti language has been checked through the following minimal pairs.



Minimal pairs

Transcription

Meaning

shing

/ʃɪŋ/

meat

jeing

/ʒɪŋ/

filed

FINDING

The above pairs show that the phoneme /ʃ/ and /ʒ/ exist in Balti language.

Observation on phoneme /ʃ/ of the Balti language by the researcher is shown in

Diagram 4 and Table 4.

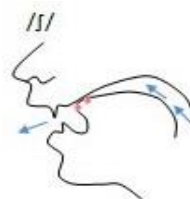


Diagram 4.

Table 4: Description of phoneme /ʃ/ in Balti language

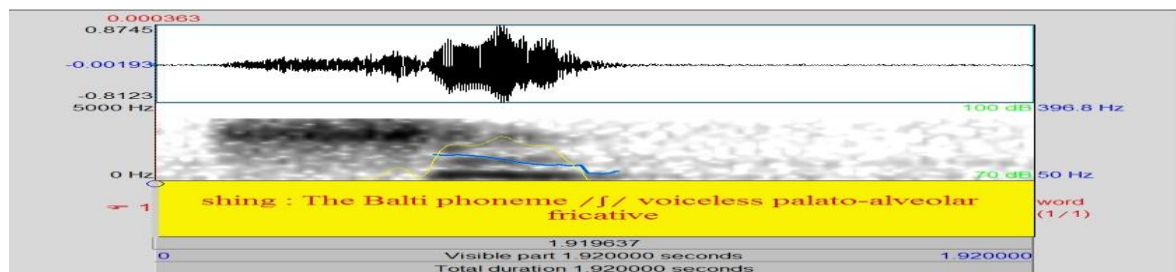
IPA symbol	/ʃ/
Place of articulation	Palato-Alveolar

Manner of articulation	Fricatives
Voicing	Voiceless
As-un-aspirated	un-aspirated
Perso-Arabic letter	ش

/ʃ/ (Palato-Alveolar)

ANALYSIS

The phoneme /ʃ/ is a voiceless palato-alveolar fricative in Balti language. For the production of this sound, the tongue raises the back of alveolar ridge as shown in the diagram 4. The air passes between the tip of tongue and the back of the alveolar ridge. When the air is pushed through narrow passage it causes a friction as shown in the spectrogram 4. No vibration has been observed during the acoustic analysis of this sound through Praat computer software (see in the spectrogram 4.). Therefore, this is a voiceless sound.



The spectrogram 4: The Balti phoneme /ʃ/

Observation on phoneme /ʒ/ of the Balti language by the researcher is shown in

Diagram 5 and Table 5.

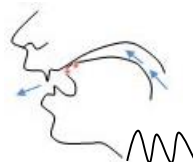


Diagram 5

Table 5: Description of phoneme /ʒ/ in Balti language

IPA symbol	/ʒ/
Place of articulation	Palato-Alveolar
Manner of articulation	Fricative
Voicing	Voiced
As-un-aspirated	un-aspirated
Perso-Arabic letter	ژ

/ʒ/ (Voiced Palato-Alveolar)

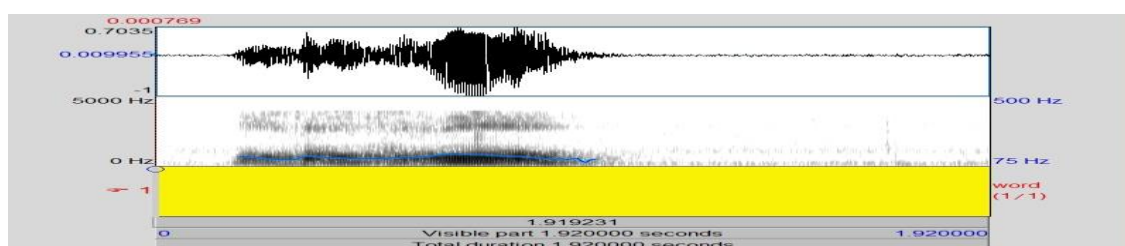
ANALYSIS

The phoneme /ʒ/ is a voiced palato-alveolar fricative in Balti language. In the articulation of this sound the tongue rises towards the back of alveolar ridge as see in the diagram 5. The air passes between the tip of tongue and the back of the alveolar ridge. When the air is pushed through narrow passage, it causes a friction as shown in the spectrogram 5. A strong vibration has been observed during the acoustic analysis of this sound through Praat shown in the spectrogram 5. Therefore this is a voiced sound.

The spectrogram 5: The Balti phoneme / ʒ/

FINDINGS:

5 Palato-Alveolar phonemes, i.e., /ʃ/, /ʒ/, /tʃ/, /dʒ/ and /tʃʰ/ have been found in the Balti language. These phonemes are produced by the Balti native speakers by touching the tip of the tongue to the back of alveolar ridge. Therefore, these are known as palate-alveolar sounds.



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