

## **Adjacent Consonants and the Universality of Sonority Sequencing Principle in Dotyali Dialects: Syllable Contact Analysis**

Dharm Dev Bhatta

Sichuan Normal University, College of Liberal Art, Chengdu China

Email: [2784136286@qq.com](mailto:2784136286@qq.com)

### **Abstract**

This paper presents on all the possible adjacent consonant letters in Dotyali, one of the descendant language of Sanskrit, mainly spoken in Shudoor Paschim Nepal [södörə-pəssimə] (Far-western) and compares the results of their phonological changes in seven local contemporary speech (dialects): Doteli, Dadeldhuri, Bajhanggi, Achhami, Baitadeli, Darchuli and Bajureli. Based on the corpus data from the field survey conducted in between July-September 2017 on a list of 1000 frequently used Dotyali words, this paper comes with a conclusion that even the onset clusters with rising sonority profile (except glides) are broken up by vowel epenthesis or simplify the clusters by deletion. It is revealed that dialects, except from the Achhami and Bajureli, the consonants with different degree of sonority across the syllable boundary tend to be changed due to syllable contact to meet Sonority hierchy, but the sonority distance between two consonants (coda and onset consonants) varies, therefore phonological changes like assimilation, dissimilation, desonorization, contact anaptyxis, contact methasis etc. goes differently. The phonological changes in Bajureli occurs maily due to other separate independent constraints.

Keywords: Dotyali Dialects; Sonority Sequencing Principle; Syllable Contact; Survey

### **A. Introduction**

Dotyali is an umbrella term that embodies all its contemporary 7 dialects, which was the official language of "Doti Kingdom (1238-1790 AD)" [1], [2] in the western part of Nepal (present Shudoor Paschim Province) and its surrounding districts and boarder districts of India, which forms a unique system in phonetics, grammar, vocabulary and written literature different from other Indian languages as Nepali, Hindi, Maithili, Sanskrit etc.. In its past 800 years, the pronunciation of vocabulary has changed a lot. For example, "unbroken" [ək<sup>h</sup>əŋdə] becomes / ək<sup>h</sup>əŋŋə, ək<sup>h</sup>əndə / in dialects. In this study, we can't determine the exact time of such phonological changes of adjacent consonants across the syllable boundary, we only summarize how the syllable contact repairs wide variety of sonority sequences (i) falling and flat, (ii) rising and narrow on its input form (formal or the written form) in the different contemporary speech ( out put).

Dotyali exhibits moderately complex syllable structure and the most elaborate

permitted syllable is CGVX ( X= short vowel/ a consonant, as in “believe” / pət.tjæʊ.nʊ / -CVC-CGVV.CV), shows that the only permissible sequence at onset is the consonant+glide (CG/j ,w/) [3] that follows an ‘optimal syllable’. Sonority Sequencing Principle (SSP) predicts that the sonority increases towards the nucleus, then decreases away from the nucleus towards the coda [4 ]. The CGVX structured syllable in Dotyali is restricted in monosyllabic words and word final position [3] that creates the possibility of adjacent consonant sequences across the syllable boundary. Here at least the two basic questions arise: (i) Do all consonants are permissible at coda? What types of consonant sequences are permissible in Dotyali dialects? Do the adjacent consonants (input form) and their sound changes (output form) in Dotyali dialects is induced by syllable contact?

The basic idea about the syllable contact is that languages try to avoid the sequence of rising sonority (bad contact) across the syllable boundary [5], [6], [7]. “Syllable Contact Law” holds that syllable breaks favor decreasing sonority and demands the sonority distance between the coda the following adjacent onset initial be as large as possible[8]. The notion of a sonority distance stratum\*DIST+6 stresses that each constraint encompasses with the sonority rise of 6 interval (both kinds of sequences: fricative-glide or stop-rhotic) [4]. The above mentioned phenomena at least for Dotyali dialects are debatable because not all the dialects follow sonority hierarchy across the syllable boundary. Even the dialects that respect syllable contact law do not strictly makes the sonority distance by 6 interval points, as not all the preferred coda consonants are [+sonorant] and preferred onset initials are [-sonorant]. However, syllabification of Dotyali dialects cannot be affected by sonority hierarchy (bad contact) or sonority distance, as consonant clusters are strictly restricted. Regarding input clusters at onset, the epenthesis breaks up all types of onset consonant clusters (CC) and epenthesis site is determined by syllable contact,i.e, the contact epenthesis is peripheral if C1 is more sonorous than C2 (CCV→ VC.CV), but epenthesis is internal if C1 is less sonorous than C2 ( CCV→CV.CV). For example “Female” Stri (CCCCV) is pronounced as /ɪs.tɪ.rɪ/ ɪs.tə.rɪ/ (i.e [CCCCV] input→VC.CV.CV(output) [3], where edge epenthesis [ɪ] emerges before sibilant because of the falling or flat sonority between /st/, but internal epenthesis in rising sonority (between/tr/). Here the two different predictions that syllable contact analysis predicts meet here: (i) The inserted vowel before the cluster breaks the cluster but don’t interrupt falling/ flat sonority clusters (sequences). (ii) The internal epenthesis breaks up the clusters and the sequences that have bad contact get changed (rising sonority).

Sonority shows the resonance of one sound segment in relation to another [5],[6]. Sonorous sounds are more prominent in amplitude and length than less sonorous sounds. In binary terms, the sonorants [+son] (glides-liquids– nasals) are more sonorous than the obstruent [-son] (fricatives – affricates -stops), However, only this binary grouping is insufficient in Dotyali, as there exists a hierarchy of sonority even within its obstruent. The Sonority Scale (Most sonorous -Least sonorous) of Dotyali consonant can be assumed: [+son] glides<sup>14</sup> > rhotics<sup>13</sup> (r/ɾ)>lateral<sup>12</sup> > nasals<sup>11</sup> >

[-son] voiced aspirated affricate<sup>10</sup>> voiced aspirated stops<sup>9</sup>>voiced unaspirated fricatives<sup>8</sup> >voiced unaspirated affricate<sup>7</sup> > voiced unaspirated stops<sup>6</sup> > voiceless aspirated affricate<sup>5</sup> > voiceless aspirated stops<sup>4</sup> >- voiceless unaspirated fricatives<sup>3</sup>> voiceless unaspirated affricate<sup>2</sup> >voiceless unaspirated stops<sup>1</sup> [4].

Dotyali shares most of the consonant letters used in Devanagari writing system, but not all of them phonologically make distinction in its speech which are presented in the table 1. Consonant in brackets are observed as allophones.

	Stops				Affricates				Nasal	Later	Tril	Fricativ		Appimn
	Vl		Vd		Vl		Vd		Vd		vd	Vl	Vd	Vd
Bilabials	p	p <sub>h</sub>	b	b <sub>h</sub>					m					w
Dentals	t	t <sup>h</sup>	d	d <sub>h</sub>					n	l	r	s		
Alveolars					t	t <sub>h</sub>	d	d <sub>h</sub>	(ɳ)			ʃ		
Retroflexes	ʈ	ʈ <sup>h</sup>	ɖ	ɖ <sub>h</sub>					ɳ		(ɽ)	(ʂ)		
Palatals														j
Velars	k	k <sub>h</sub>	g	g <sub>h</sub>					ŋ					
Glottal													ɦ	

Table 1. Dotyali Consonant Inventory [3]

[ɳ] is the allophone of [ŋ] before glide [j] as in “here”[ɳja/ ɳæ], it gets dentalized [n] in between vowels and at coda; [ʂ] only exhibits in Sanskrit loanwords and usually gets dentalized [s] ,it is often pronounced [kh] followed by other sibilant due to dissimilation. Similarly, separate letter for the retorization of trill [r] and retroflex stops [ɽ] is common in Old Dotyali writing, which only exists in contemporary speech [ɽ]. Moreover, not all the Dotyali consonant segments have equal distribution in its syllable. The distributional restrictions of Dotyali consonant phoneme is shown in table (2), where the symbols: \_ marks phonetic environment, # matks syllable boundary, #\_ v marks beginning of a syllable, /v\_v/ marks intervocalic position, /v\_cv/: at coda (preceding syllable), and /vc\_v/ marks at onset initial (following syllable).

Phoneme	Word Initial	Word Medial Position		
	/#_V/	/V_V/	/V_CV/	/VC_V/
[ɳ]	-	+	+	+
[ʃ]	+	-	-	-

[j, w, fh]	+	+	-	-
Asprated	+	⊖	⊖	⊖
Others	+	+	+	+

Table 2. Distributional Restrictions of Dotyali Consonant

Dotyali retroflex nasal [ŋ] is restricted at word initial onset position; Palatal sibilant [j] only makes distinction to dental [s] before glides and long high vowels; Semi-vowel (glides) [j, w] and voiced fricative [fh] don't make adjacent to any other consonant across the syllable boundary. Aspirated sounds (stops/affricates) in between vowels generally get unaspirated and devoiced [3] and their sequence across syllable boundary varies in dialects, which is either determined by the syllable contact or due to other separate independent constraints ,it will be discussed in (3).

## B. Methodology

This paper employed a list of 1000 frequently used Dotyali words “The Basic Vocabulary for Dotyali Dialects Survey” compiled by Bhatta for Ph.d dissertation [3], that includes most of the commonly used words from the book “The History and Spoken Language of That Time”[9] , and “Vocabulary for the Nepalese Language Survey (LinSuN) ” [10 ].

The field survey in 7 dialects: Dhunga-Doti, Babangaun-Dadeldhura, Shaphe-Achham, Martadi-Bajura, Golai-Bajhang, Patan- Baitadi, Gartaula-Darchula, was completed in between July-September 2017 . The seven male native speakers without any academic degree and above 60 years from their respective district, who live within a small particular area and have very little communication with the people of other language communities were selected for the corpus data. During this survey, Praat and "Feifeng language field survey software" developed by Professor Pan Wuyun and others from Shanghai Normal University was employed and the sampling rate of recording was 44100HZ and the length of recording (waveform) each word was 5 seconds. Before recording, the speaker were asked to be familiar with the words from our vocabulary list to make sure that he knows each word and can pronounce it accurately in his native tongue. Then, the recording materials were transcribed using International Phonetic Alphabet.

## C. Result and Discussion

### 3.1 Rising sonority and Syllable Contact

Generally, rising sonority at syllable boundary remains unchanged in Achhami and Bajureli dialect and syllable contact cannot strengthen the sonority of coda or weaken the sonority of adjacent onset initial. Only the obstruent-nasal sequence in verb gets repaired in Achhami. Other some minor changes like devoicing, loss of aspiration and internal epenthesis are not because of syllable contact but due to an independent constraint that aspirated are restricted at coda or onset initial. The bad

contact at syllable boundary gets repaired in other dialects, some examples are given below.

### **Obstruent-sonorant sequence**

#### **Fricative, affricates, plosives - liquids**

a. All the Obstruent – liquid → no change/ Achhami and Bajureli:

- sn, sm, sr, sl (ex. "ladder" lɪsnʊ, "calcify" bʰəsmə, "real" əslɪ, "a kind of tree" kʰəsɾʊ)
- dʒr, pr → no change, (ex. "thunder" bədʒrə, "well grow" səprənʊ)
- dʰl → dl, (ex. "grow" bədʰla → bədlə)

Though the voiced consonant at coda gets devoiced but it is not due to syllable contact as it could not repair sonority hierarchy. In addition, the devoicing increases rising sonority interval, which goes the opposition of syllable contact law.

b. Other dialects:

- sn, sm, sl → internal epenthesis, (ex. lɪsnʊ → lɪsənʊ, bʰəsmə → bʰəsəmə, əslɪ → əsəlɪ)
- sr → rs, (contact metathesis), (ex. kʰəsɾʊ → kʰərsʊ)
- dʒr, pr → Contact epenthesis, (ex. bədʒrə → bədʒʊrə/ bədʒʊrʊ, səprənʊ → səpərɲʊ/ səpədʒʊ)
- dʰl → rl (retorization), (ex. bədʰla → bəɾələ, bəɾəla, bərlə)

Contact epenthesis (anyptysis), contact metathesis, retorization of stops (sonorization) changes rising sonority into falling sonority. Coda ([dʰ]) loses aspiration and got retorized not because it is restricted but for strengthening coda.

#### **Plosives/ affricates –nasal**

a. All plosives/ affricates –nasal → no change / Bajureli

b. All plosives/ affricates- nasal → regressively assimilated / Baitadeli and Darchuli.

- Voiceless plosives /affricates – nasal ([obs-son]) → ([obs-obs]), (ex. "pluck" tɪpnʊ → tɪppə/ tɪppʊ, "put" rakʰnʊ → rakʰkʰʊ/ rakʰkʰə)
- Voiced aspirated plosives /affricates - n([obs-son]) → ([obs-obs]), (ex. "mix" gabʰnʊ → gabbʊ/ gabbə)

The voiced aspirated coda first loses aspiration, then the onset initial gets assimilated. However the regressive assimilation weakens the sonority of onset initial and changes the rising sonority sequences into null sonority sequences.

c. Other dialects:

- Voiceless plosives /affricates - n([obs-son]) → ([obs-obs]), desonorizes the onset initial, (ex. tɪpnʊ → tɪpdə/ tɪpdʊ, rakʰnʊ → rakʰdʊ/ rakʰdə)
- Voiced aspirated plosives /affricates – n([obs-son]) → ([obs-obs]) desonorizes the onset initial, (ex. gabʰnʊ → gabdʊ/ gabdə),

First the onset gets desonorized (become obstruent), then coda obstruent gets devoiced (weakened) in order to repair the sonority hierarchy between the coda and the onset.

Exceptions:

- tʃ, t, dʒ, tʰ- n([obs-son]) → ([obs-obs]) regressively assimilated / all dialects expect Bajureli, (ex. "squeak" tʃimotʰno → tʃimətʰtʰo, tʃimotʰtʰo, tʃimotʰtʰə)
- pʰn → internal epenthesis (ə) / all dialects expect Bajureli (ex. "own" apʰnəi → apʰənui, apʰənoi, əpʰənui)

**Nasal-liquids**

- a. ml, ŋl → no change / Achhami and Bajureli, (ex. "lemon" əmla /ɪmla, "basket" naŋlo)
- b. ml, ŋl → internal epenthesis (ə/ɪ) / Other dialects, (ex. əmla → əməla/ɪmɪla, naŋlo → naŋəlo)

**Obstruent- Obstruent**

**Voiceless-voiced**

- a. kd → no change/ Achhami and Bajureli, (ex. "can do" səkdo)
- b. kd → gd (**progressively** assimilated) / Other dialects, (ex. səkdo → səgdo)

Coda strengthening through progressive assimilation, changing rising sonority sequences into equal sonority sequences.

**Unaspirated-aspirated**

- a. Unaspirated-aspirated → no change or coda drop off / Achhami and Bajureli, (ex. "slate" pətʰerə → pətʰerə, patʰərə)
- b. Unaspirated-aspirated → no change / Baitadeli and Darchuli

Regarding the sequence of unaspirated and their aspirated counterpart, the above mentioned dialects respect the rising sonority with just a single sonority interval.

Unaspirated-aspirated → progressively assimilated/ Other dialects, (ex. pətʰerə → patʰtʰərə)

Only in Doteli, Dadeldhuri and Bajhanghi dialect strictly coda gets weakened to repair bad contact sequences.

Exception:

- ddʰ → dd/dʰdʰ ( get assimilated in all dialects ) ( ex. "Buddha" bəoddʰə → bəuddə, "worm" gəddʰe → gəddʰe). Both process (regressive/progressive) changes rising sonority into equal (null) sonority.

**Plosive-affricate**

- a. ptʃ, bdʒ → no change / Achhami and Bajureli, (ex. "lock" kəptʃa)

c. Other dialects:

- ptʃ → bdʒ (ex. kəptʃa → kəbdʒa)
- bdʒ → no change ( ex. kəbdʒa → kəbdʒa/ kabdʒa)

**Plosive- fricative**

Generally, plosive- fricative sequences are rarely found in Dotyali and its dialects. Only /ks/ sequence very frequent in Sanskrit loanwords that gets repaired in two ways: (i) Coda drops off, (ii) Assimilation.

a. kʃ→tʃ<sup>h</sup>tʃ<sup>h</sup>/g/tʃ / Doteli, Dadeldhuri, Bajhangi, Baitadeli, (ex. "monster" rakʃəsə→ratʃ<sup>h</sup>tʃ<sup>h</sup>esə/ ragəsə, "witness"sakʃi →sāʃi )

First the affrication of sibilant weakens the onset, then only the coda gets strengthened through progressive assimilation and repairs the bad contact. Another way is coda/ initial drop.

b. kʃ→tʃ<sup>h</sup>tʃ<sup>h</sup>, tʃ<sup>h</sup> / Other dialects, (ex. rakʃəsə→ratʃ<sup>h</sup>tʃ<sup>h</sup>esə, sakʃi →sāʃi )

### 3.2 Falling sonority and Syllable Contact

The changing of adjacent consonant across the syllable boundary mainly occurs not for maintaining sonority distance. Except from Bajureli, the less the sonority distance, the more adjacent consonant tend to repair sonority.

#### Sonorant-sonorant

##### Rhetoric- Liquids

a. rl→no change /Achhami and Bajureli, (ex. "may die" mərɫa)

b. rl→ internal epenthesis (ə) / other dialects, (ex., mərɫa→mərəɫə/ mərəɫə )

Though the sequence faiths the falling sonority across the syllable boundary but sonority interval is less, therefore internal epenthesis breaks the sequence in other dialects except Achhami and Bajureli.

##### Rhetoric- nasal

a. rn, rm→no change/ Bajureli, (ex., "graze" tʃərnʊ→tʃərnʊ)

rn→nn/ Achhami, Baitadeli, (ex. tʃərnʊ→tʃənnʊ/ tʃənnə)

rn→dd/ other dialects , (ex. tʃərnʊ→tʃəddʊ/tʃəddə)

b. rm→internal epenthesis (ə) /all dialects except Bajureli, (ex. "shyness" sərɫə→sərəɫə)

c. rɫ →rn / Achhami, Baitadeli and Bajureli, (ex. " River (name)" kərɫali→kərɫali)  
(only appear in noun)

rɫ→ no change / other dialects

Coda [r] gets reversely assimilated in Achhami and Baitadeli and reduces sonority interval. In other dialects the onset nasal first gets desonorized, then only the coda gets progressively assimilated, the process goes like: tʃərnʊ→tʃərdʊ→tʃəddʊ, -rn→rd→dd.

##### Lateral- nasal

ln→ll / except Bajureli (ex. "fall" dʰəlnʊ→dʰəllʊ, dʰəllə)

Regressive assimilation in dialects except Bajureli (ln→ll) changes of falling sonority sequence into equal ( null) sonority sequence.

#### Sonorant-obstruent

##### Rhetoric (Trill ) - stops/ affricates / fricative

Rhetoric and obstruents makes the greatest sonority distance in between coda and onset initial, they generally do not change in dialects. But, Bajhangi and Darchuli

dialect tend to maintain less sonority distance between coda and onset, therefore affricates in onset get strengthen by a single sonority interval. Except Bajureli, Bajhanggi and Darchuli, other dialects weaken the onset and maintain higher sonority distance.

Bajani and Darchuli

- a.  $rtʃ \rightarrow rdʒ$  (voicing) / in nouns , ( ex. "spend"  $k^h \text{ə}rtʃ^h \text{ə} \rightarrow k^h \text{ə}rdʒ \text{ə}$ )  
-  $rdʒ \rightarrow rdʒ^h$  (aspiration)i, (ex., "loan"  $k \text{ə}rdʒ \text{ə} \rightarrow k \text{ə}rdʒ^h \text{ə}$ )
- b.  $rtʃ^h \rightarrow$  no change / nouns  
-  $rtʃ^h$  ( $rtʃ^h \text{ə}$ )  $\rightarrow$  a syllable insertion ([ə]) / in verbs (except Achhami and Bajureli) (ex. " die"  $m \text{ə}rtʃ^h \text{ə} \rightarrow m \text{ə}r \text{ə}ntʃ^h \text{ə}$ ,  $-rtʃ^h \text{ə} > [ \text{ə}ntʃ^h \text{ə} -$ )
- c. r-voiced aspirated  $\rightarrow$  lose aspiration / except Bajhanggi and Darchuli, (ex."dead body"  $m \text{ə}rd^h \text{ə} \rightarrow m \text{ə}rd \text{ə}$ )

### Lateral- stops/ affricates / fricative

Generally, the adjacent of lateral and other stops and affricates remains unchanged in all dialects, few exception:

- a.  $ld \rightarrow dl$  / Bajureli ( ex. " Turmeric"  $f \text{ə}ld \text{ə} \rightarrow f \text{ə}dl \text{ə}$ )  
Change of falling sonority into rising sonority through contact metathesis.
- b.  $lk \rightarrow lg$  (voicing) / Bajhanggi (ex. " pecify "  $p \text{ə}lk \text{ə} \rightarrow p \text{ə}lg \text{ə}$ )
- c.  $ld \rightarrow$  no change / Achhami and Bajureli  
 $ld \rightarrow ld/d\text{d}$  / Bajhanggi, (ex. "pit"  $k^h \text{ə}ld \text{ə} \rightarrow k^h \text{ə}ld \text{ə} / k^h \text{ə}d\text{d} \text{ə}$ )  
 $ld \rightarrow lt$  (devoicing) / Other dialects (ex.  $k^h \text{ə}ld \text{ə} \rightarrow k^h \text{ə}l\text{t} \text{ə}$ )
- d.  $ltʃ \rightarrow ldʒ$  (voicing) / except Achhami and the Bajureli (ex. "lock"  $t \text{ə}ltʃ \text{ə} \rightarrow t \text{ə}ldʒ \text{ə}$ )  
 $ltʃ \rightarrow ldʒ^h$  (aspirated) in Bajhanggi and Baitadeli (ex.  $t \text{ə}ldʒ \text{ə} \rightarrow t \text{ə}ldʒ^h \text{ə}$ )  
 $ldʒ^h \rightarrow ldʒ$  (loss aspiration) / except Bajhanggi and Baitadeli (ex.  $t \text{ə}ldʒ \text{ə} \rightarrow t \text{ə}ldʒ^h \text{ə}$ )

### Nasal- stops/ affricates / fricative

- a.  $n\text{d}, n\text{t}^h \rightarrow n\text{d}, n\text{t}^h$  (dissimilated) / Achhami and Bajureli (ex. "unbroken "  $\text{ə}k^h \text{ə}n\text{d} \text{ə} \rightarrow \text{ə}k^h \text{ə}n\text{d} \text{ə}$ )  
 $n\text{d}, n\text{t}^h \rightarrow n\text{ŋ}$  (regressively assimilated) / other dialects (ex.  $\text{ə}k^h \text{ə}n\text{d} \text{ə} \rightarrow \text{ə}k^h \text{ə}n\text{ŋ} \text{ə}$ )  
In order to achieve the less sonority distance in falling sequences, the coda or the onset gets weakened through contact dissimilation and assimilation
- b.  $\text{ŋ}k^h \rightarrow \text{ŋ}k$  / only before schwa, (ex..g. "shell"  $s \text{ə}ŋk^h \text{ə} \rightarrow s \text{ə}ŋk \text{ə}$ )  
 $\text{ŋ}g \rightarrow \text{ŋ}ŋ/\text{ŋ}$  (coda drops off) / Doteli, Dadeldhuri and Achhami, (ex." aspicious"  $m \text{ə}ŋg \text{ə}l \text{ə}, m \text{ə}ŋŋ \text{ə}l \text{ə}, m \text{ə}ŋl \text{ə}$ )
- c. m, n- aspirated plosives/affricates ( $p^h, t^h, k^h, b^h, d^h$ )  $\rightarrow$  lose aspiration ( before schwa ) / except Bajhanggi, (ex."skirt"  $dʒ^h \text{ə}mp^h \text{ə}r \rightarrow dʒ^h \text{ə}mp \text{ə}r \text{ə} / dʒ^h \text{ə}mp \text{ə}r \text{ə}$ , "serious"  $g \text{ə}mb^h \text{ə}r \text{ə} \rightarrow g \text{ə}mb \text{ə}r \text{ə}$ , "father-in-law"  $s \text{ə}m\text{d}^h \text{ə}i \rightarrow s \text{ə}m\text{d} \text{ə} / s \text{ə}m\text{d} \text{ə}$ )  
m- unaspirated stops and fricatives ( t, t, tʃ, dʒ, k, d, p )  $\rightarrow$  no change/ Doteli, Dadeldhuri and Achhami  
mt, mʃ, mtʃ  $\rightarrow$  coda drop off (vowel gets nasalized) / except Doteli, Dadeldhuri and Achhami  
(ex., "pine"  $s \text{ə}m\text{t} \text{ə} \rightarrow s \text{ə}m\text{t} \text{ə}$ , "tweezers"  $tʃ \text{ə}m\text{t} \text{ə} \rightarrow tʃ \text{ə}m\text{t} \text{ə}$ , "Spoon"  $tʃ \text{ə}m\text{t} \text{ə} \rightarrow tʃ \text{ə}m\text{t} \text{ə}$ )

- d. ms→ms/ ns/ŋs ( no regularity (sonority preserved) , (ex.: "break"  
bid<sup>h</sup>omsə→bid<sup>h</sup>uŋsə, bid<sup>h</sup>onsə)  
ns→tʃ<sup>h</sup> (affrication)/ Achhami and Bajureli , (ex. "human" mənsə→mantʃ<sup>h</sup>ə,  
mantʃe)  
ns→no change / other dialects

### **Obstruent-obstruent ( falling sonority)**

#### **Fricative- plosive**

Achhami and Bajureli:

- a. st, sb→ no change (ex. "same/similar" dʒəstəɪ→ dʒəstəɪ/dʒəstəɪ)  
b. st<sup>h</sup>→st (ex. "Surname" əwəst<sup>h</sup>i→ ostɪ/əbəstɪ)

Baitadeli and Darchuli:

- a. st, sd, → ss (**regressively** assimilated ) (ex. dʒəstəɪ→dʒəssəɪ, "Sitting"  
bəsdə→bəssa )  
b. st<sup>h</sup>→t<sup>h</sup>t<sup>h</sup> in (ex. "Surname" əwəst<sup>h</sup>i→ ot<sup>h</sup>t<sup>h</sup>ɪ)

Other dialects:

- a. st→ ss (**regressively** assimilated ) (ex. dʒəstəɪ→dʒəssəɪ )  
b. sd, st<sup>h</sup> →t<sup>h</sup>t<sup>h</sup> (ex. "Sitting" bəsdə→bət<sup>h</sup>t<sup>h</sup>ə, "Surname" əwəst<sup>h</sup>i→ ot<sup>h</sup>t<sup>h</sup>ɪ)

#### **Plosive-plosive**

- a. d<sup>h</sup>t, d<sup>h</sup>d→rt/ɾt, dɖ/ ɾd ( respectively) / except Bajureli  
(ex. " a lot" bəd<sup>h</sup>ta→bərta, "growth" bəd<sup>h</sup>da→bədɖa, bərɖa) , coda strengthened,  
onset strengthened through dissimilation and assimilation  
b. d<sup>h</sup>t/d<sup>h</sup>d →dɖ, dɖ (coda weakened and ) / Bajureli (ex. bəd<sup>h</sup>ta→bədɖa, bəd<sup>h</sup>da→  
bədɖa)

### **3. 3 Equal (null) sonority and syllable contact**

#### **Nasals**

- a. mn→no change/ Bajureli (ex. "move" g<sup>h</sup>ʊmnʊ)  
mn→mm ( assimilated) /Baitadeli and Darchuli (ex. g<sup>h</sup>ʊmnʊ→g<sup>h</sup>ʊmmə,  
g<sup>h</sup>ʊmmʊ)  
mn→md ( dissimilated) / other dialects, (ex. g<sup>h</sup>ʊmnʊ→g<sup>h</sup>ʊmdʊ)  
b. nm→ internal epenthesis/ Bajangi, Achhami, and Darchuli, (ex."birth"  
dʒənəmə→dʒənəmə)  
nm→no change/ other dialects

#### **Plosives**

- a. pt, pk→no change/ all dialects, ( ex. "week" səptafə→səptafə/ səpta)  
b. pɿ→coda drop off / Doteli, Dadeldhuri, Baitadeli, and Darchuli, (ex. "pour  
(move)"g<sup>h</sup>ʊpɿ→g<sup>h</sup>ʊʊɿ)  
c. kɿ→ɿk ( transposition) / exxcept Bajureli, ( ex." flesh" tʃokɿ→tʃʊɿk)

From the above mention examples and roles of syllable contact in different dialects, it is cleared that Bajureli not only has preserved most of the ill-formed sequences (obstruent-sonorant, nasal-liquids, plosive-affricate, voiceless-voiced, unaspirated-aspirated) in which the latter one (onset initial) is higher in sonority than

the former one (coda), even the well-formed adjacent consonant gets metathesized and strengthen the sonority of onset initial. Moreover, Achhami and Bajureli prefer the onset initial be more sonorous than preceding coda and the greater the sonority distance, the better. If the sonority distance is less, the coda tends to drop off or weakened by de-sonorizing, devoicing, diaspiration etc.. Except Achhami and Bajureli dialects, the syllable contact over ill-formed adjacent consonants and sonority distance in a word treats differently. Baitadeli and Darchuli prefer the smaller the distance, the better. But, Doteli, Dadeldhuri and Bajhangi favor the greater the fall of sonority in between the coda and onset initial, the better. The less the sonority fall be repaired by internal epenthesis or simply by other phonological process. That is just opposite in Bajureli and Achhami. In other words, less-more sonorous adjacent consonant are very frequent in Bajureli and Achhami, more- less sonorous adjacent consonant are frequent in Doteli, Dadeldhuri and Bajhangi.

## 1. Conclusion

This comparative study shows that though syllable contact constraints works out mostly but not fully, Syllable contact in OT can be marginal in some dialects of the same language. In case of Dotyali dialects, though most of the dialects are faithful to Syllable contact law , still the syllable contact can not be the characteristic of Dotyali, because even the dialect that prefer syllable and syllable slope also respect the two consonant with the same sonority across the syllable boundary and the sonority rise/fall greater than 1 sonority interval over a syllable boundary are also acceptable, which is not just limited within obstruent-obstruent, voiceless-voiced, unaspirated-aspirated sequences and vice versa. The Syllable Contact in Dotyali dialects play an important role to structure the dialectal phonology but it doesn't exactly require codas to be as sonorant as possible, and onsets to be as non-sonorant as possible.

This study is the summary of all the possible adjacent consonants and their sound change due to syllabus contact that makes the dialects phonologically unique. As these dialects are spoken in a small area and have on influence eachother, the syllable contact rules alone may not be sufficient for the shape of dialectal phonology. However, we believe that our first step findings will support further research on Dotyaly and its dialectal phonology.

## 2. Appendix

Vocabulary								
Rising Sonority Sequences								
	Gloss with IPA ( Formal lg)	Doteli	Dade ldhur i	Bajha ngi	Achh ami	Baitad eli	Darc huli	Bajur reli

-ŋl-	basket	ना इलो	naŋlo	naŋəl o	naŋəl o	naŋəl o	naŋlo	naŋəl o	naŋəl o	naŋlo	
-ml-	lemon	अ म्ला	əmla		imila	imila	imila	imla	iməla	iməla	əmla
-sn-	ladder	लिसु	lisnʊ	lisənʊ	lisən ʊ	lisənʊ	lisnʊ	lisənʊ	lisən ʊ	lisən ʊ	lisnʊ
-sm-	calcify	भष्म	b <sup>h</sup> əsm ə	b <sup>h</sup> əsə mə	b <sup>h</sup> əsə mə	b <sup>h</sup> əsə mə	b <sup>h</sup> əs mə	b <sup>h</sup> əsə mə	b <sup>h</sup> əsə mə	b <sup>h</sup> əs mə	
-sn-	to cough	काँसु	kāsnu	kāt <sup>h</sup> t <sup>h</sup> ʊ	kāt <sup>h</sup> t <sup>h</sup> ʊ	kāt <sup>h</sup> t <sup>h</sup> ʊ	kāt <sup>h</sup> t <sup>h</sup> ʊ		kāssə	kāssə	kāsnu
-kr-	cycle	चक्र	tʃəkɾə	tʃəkkə rə	tʃəkk ərə	tʃəkkə rə	tʃəkk ərə	tʃəkkə rə	tʃəkk ərə	tʃəkɾə	
-pr-	well grow	सप्रि नु	səprɪn ʊ	səpəd dʊ	səpə ddʊ	səpəd dʊ	səpəd dʊ	səpən ɳʊ	səpən ɳʊ	səprə nʊ	
-dʒr-	Thund er	बज्र	bədʒɾə	bədʒʊ rə	bədʒ urə	bədʒʊ rʊ	bədʒɾə	bədʒʊ rə	bədʒ urə	bədʒɾə	
-sr-	tree (N)	खसु	k <sup>h</sup> əsɾ ʊ	k <sup>h</sup> ərs ʊ	k <sup>h</sup> ərs ʊ	k <sup>h</sup> ərsʊ	k <sup>h</sup> ərs ʊ	k <sup>h</sup> ərsʊ	k <sup>h</sup> ərs ʊ	k <sup>h</sup> əsɾ ʊ	
-dʒl-	may ring	ब ज्ला	bədʒl a	bədʒə lə	bədʒ əlo	bədʒəl o	bədʒl o	bədʒəl o	bədʒl o	bədʒl a	
-dl-	may rotten	स इला	sədla	səɾələ	səɾəl o	səɾələ	səɾla	səɾələ	səɾla	sədla	
-d <sup>h</sup> l-	may grow	ब द्ला	bəd <sup>h</sup> la	bəɾələ	bəɾəl o	bəɾələ	bəɾla	bəɾələ	bəɾla	bədla	
-pn-	pluck	टिप्पु	tɪpnʊ	tɪbdʊ	tɪbdʊ	tɪbdʊ	tɪbdʊ	tɪppə	tɪppʊ	tɪpnʊ	
-p <sup>h</sup> n-	own	आ	ap <sup>h</sup> nəi	ap <sup>h</sup> ən ʊi	ap <sup>h</sup> ə nʊi	ap <sup>h</sup> ən ʊi	ap <sup>h</sup> ən ʊi	ap <sup>h</sup> ən ʊi	ap <sup>h</sup> ən ʊi	ap <sup>h</sup> nə i	

		फनै								
-t <sup>h</sup> n-	squeak	चिँमो ठनु	tʃimot <sup>h</sup> <sub>n</sub> ʊ	tʃimət <sup>h</sup> <sub>ʰtʰ</sub> ʊ	tʃimə <sup>h</sup> <sub>tʰtʰ</sub> ʊ	tʃimot <sup>h</sup> <sub>tʰ</sub> ʊ	tʃimət <sup>h</sup> <sub>ʰtʰ</sub> ʊ	tʃimət <sup>h</sup> <sub>tʰə</sub>	tʃimot <sup>h</sup> <sub>ʰtʰ</sub> ʊ	tʃimot <sup>h</sup> <sub>n</sub> ʊ
-k <sup>h</sup> n	keep	राख्नु	rak <sup>h</sup> n <sub>ʊ</sub>	rak <sup>h</sup> d <sub>ʊ</sub>	rak <sup>h</sup> d <sub>ʊ</sub>	rak <sup>h</sup> d <sub>ʊ</sub>	rak <sup>h</sup> d <sub>ʊ</sub>	rak <sup>h</sup> k <sup>h</sup> <sub>ə</sub>	rak <sup>h</sup> k <sup>h</sup> <sub>ʰʊ</sub>	rak <sup>h</sup> n <sub>ʊ</sub>
-b <sup>h</sup> n	merge	गाभ्नु	gab <sup>h</sup> n <sub>ʊ</sub>	gabd <sub>ʊ</sub>	gabd <sub>ʊ</sub>	gabd <sub>ʊ</sub>	gabd <sub>ʊ</sub>	gabbə	gabb <sub>ʊ</sub>	gabn <sub>ʊ</sub>
-d <sup>h</sup> n	grow	बढनु	bəd <sup>h</sup> n <sub>ʊ</sub>	badq <sub>ʊ</sub> / bədq <sub>ʊ</sub>	badq <sub>ʊ</sub> / bədq <sub>ʊ</sub>	badq <sub>ʊ</sub>	bədq <sub>ʊ</sub>	badqə	badq <sub>ʊ</sub>	bədn <sub>ʊ</sub>
-kʃ-	monst er	राक्ष स	rakʃəs <sub>ə</sub>	ratʃ <sup>h</sup> tʃ <sup>h</sup> <sub>ʰesə/</sub> ragəs <sub>ə</sub>	ratʃ <sup>h</sup> t <sub>ʃʰesə</sub> /ragə sə	ratʃ <sup>h</sup> tʃ <sup>h</sup> <sub>esə/</sub> ragəsə	ratʃ <sup>h</sup> t <sub>ʃʰesə</sub>	ratʃ <sup>h</sup> tʃ <sup>h</sup> <sub>esə/ra</sub> gəsə	ratʃ <sup>h</sup> t <sub>ʃʰesə</sub>	ratʃ <sup>h</sup> tʃ <sup>h</sup> <sub>ʰesə</sub>
	witnes s	साँक्षी	sakʃi	sāʃi	sāʃi	saʃ <sup>h</sup> i	sāʃi	sāʃi	saʃ <sup>h</sup> i	saʃ <sup>h</sup> i
Falling Sonority Sequences										
-rk-	pastur e	खर्क	k <sup>h</sup> ərək <sub>ə</sub>	k <sup>h</sup> ərək <sub>ə</sub>	k <sup>h</sup> ərək <sub>ə</sub>	k <sup>h</sup> ərəkə	k <sup>h</sup> ərək <sub>ə</sub>	k <sup>h</sup> ərəkə	k <sup>h</sup> ərək <sub>ə</sub>	k <sup>h</sup> ərək <sub>ə</sub>
-rtʃ <sup>h</sup> -	dies	मर्छ	mərtʃ <sup>h</sup> <sub>ə</sub>	mərən tʃ <sup>h</sup> ə	mərə ntʃ <sup>h</sup> ə	mərən tʃ <sup>h</sup> ə	mərə ntʃ <sup>h</sup> ə	mərtʃ <sup>h</sup> <sub>ə</sub>	mərə ntʃ <sup>h</sup> ə	mərtʃ <sup>h</sup> <sub>ə</sub>
	faint	मुर्छा	mɔrtʃ <sup>h</sup> <sub>ʰa</sub>	mɔrtʃ <sup>h</sup> <sub>ʰa</sub>	mɔrt <sub>ʃʰa</sub>	mɔrtʃ <sup>h</sup> <sub>a</sub>	mɔrtʃ <sup>h</sup> <sub>ʰa</sub>	mɔrtʃ <sup>h</sup> <sub>a</sub>	mɔrtʃ <sup>h</sup> <sub>ʰa</sub>	mɔrtʃ <sup>h</sup> <sub>ʰa</sub>
-rb <sup>h</sup> -	concei ve	गर्भ	gərb <sup>h</sup> <sub>ə</sub>	gərbə	gərb ə	gərb <sup>h</sup> ə	gərbə	gərbə	gərb <sup>h</sup> <sub>ə</sub>	gərbə
-rdʒ-	loan	कर्जा	kərdʒ <sub>a</sub>	kərdʒ <sub>ə</sub>	kərd ʒə	kərdʒ <sup>h</sup> <sub>a</sub>	kərdʒ <sub>a</sub>	kərdʒ <sub>a</sub>	kərdʒ <sub>ʰa</sub>	kərdʒ <sub>a</sub>
-rdʒ <sup>h</sup> -	wither ed	मुर्झा	mɔrd ʒ <sup>h</sup> a	mɔrd ʒa/ mɔdʒ a	mɔrd ʒa/m ɔdʒa	mɔrdʒ <sup>h</sup> <sub>ʰa</sub>	mɔrd ʒa/ mɔdʒ a	mɔrdʒ <sup>h</sup> <sub>a/</sub> mɔdʒ a	mɔrd ʒ <sup>h</sup> a	mɔrd ʒa/ mɔdʒ a
-rs-	hot/be at	बर्सा	bərsa	bərsa	bərsa	bərsa	bərsa	bərsa	bərsa	bərsa
-rm-	modes ty	सर्म	sərmə	sərəm ə	sərə mə	sərmə	sərə mə	sərəm ə	sərə mə	sərmə

-rn-	graze	चर्नु	tʃərnʊ	tʃədd ʊ	tʃədd ʊ	tʃəddo	tʃənn ʊ	tʃənnə	tʃədd ʊ	tʃərn ʊ
-rŋ-	River	कर्णा ली	kərnəl i	kərnəl ɪ	kərn ali	kərnəl ɪ	kərna li	kərnəl ɪ	kərnə li	kərna li
	may die	मर्ला	mərɫa	merəl o	merə lo	merəl o	mərɫa	mərəl a	mərəl a	mərɫa
-lt-	rudun dant	फा ल्लु	p <sup>h</sup> altʊ	p <sup>h</sup> altʊ	p <sup>h</sup> alt ʊ	p <sup>h</sup> altʊ	p <sup>h</sup> alt ʊ	p <sup>h</sup> altʊ	p <sup>h</sup> alt ʊ	p <sup>h</sup> altʊ
-ld-	turmer ic	हल्दो	ɦəldo	ɦəldo	ɦəld o	ɦəldo	ɦəldo	ɦəldo	ɦəldo	ɦəldo
-lt-	upside	उल्लो	ʊltʊ	ʊltʊ, ʊltɪ	ʊltʊ, ʊltɪ	ʊltɪ	ʊltɪ	ʊltʊ	ʊltʊ	ʊltʊ
-ld-	pit	खा ल्लो	k <sup>h</sup> ald o	k <sup>h</sup> altʊ	k <sup>h</sup> alt o	k <sup>h</sup> aldʊ /k <sup>h</sup> ad ʊ	k <sup>h</sup> ald o	k <sup>h</sup> altʊ	k <sup>h</sup> alt o ,	k <sup>h</sup> ald o
-lk-	pecify	प ल्का	pəlka							
				pəlka	pəlka	pəlga	pəlka	pəlka	pəlka	pəlka
-ltʃ-	padloc k	ता ल्ला	taltʃa							
				taldʒa	taldʒ a	taldʒ <sup>h</sup> a	taltʃa	taldʒa	taldʒ a	taltʃa
-ldʒ <sup>h</sup> -	entang le	अ ल्ला उनु	əldʒ <sup>h</sup> a ʊnʊ							
				əldʒa	əldʒa	əldʒ <sup>h</sup> a	əldʒa	əldʒa	əldʒa	əldʒa
-ltʃ <sup>h</sup> -	lazy	अ ल्लि	əltʃ <sup>h</sup> ɪ							
				əlsɪ	əlsɪ	əlsɪ	əltʃ <sup>h</sup> ɪ	əlsɪ	əlsɪ	əltʃ <sup>h</sup> ɪ
-ln	fall	ढल्लु	d <sup>h</sup> əln ʊ	d <sup>h</sup> əllʊ	d <sup>h</sup> əll ʊ	d <sup>h</sup> əllʊ	d <sup>h</sup> əll ʊ	d <sup>h</sup> əllə	d <sup>h</sup> əll ʊ	d <sup>h</sup> əln ʊ

-nd-	unbro ken	अख ण्ड	ək <sup>h</sup> ə də	ək <sup>h</sup> ə nə	ək <sup>h</sup> ə nə	ək <sup>h</sup> ə nə	ək <sup>h</sup> ə də	ək <sup>h</sup> ə ə	ək <sup>h</sup> ə ə	ək <sup>h</sup> ə ə
-nt-	bell	घण्टा	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a	g <sup>h</sup> ənt̪a
-ŋk <sup>h</sup> -	fan	प ङ्खा	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a	pəŋk <sup>h</sup> a
	seashe ll	शंख	səŋk <sup>h</sup> ə	səŋkə	səŋkə	səŋkə	səŋkə	səŋkə	səŋkə	səŋkə
-ŋg-	auspic ious	मङ्ग ल	məŋg ələ	məŋg ələ	məŋg ələ	məŋg ələ	məŋg ələ	məŋg ələ	məŋg ələ	məŋg ələ
-mt-	pinefr uit	सि म्तो	simto	simto	simto	simto	simto	simto	simto	simto
-mt-	tweeze rs	चि म्टा	tʃimʈa	tʃimʈa	tʃimʈa	tʃimʈa	tʃimʈa	tʃimʈa	tʃimʈa	tʃimʈa
-mtʃ-	spoon	चम्चा	tʃəmtʃ a	tʃəmtʃ a	tʃəmtʃ a	tʃəmtʃ a	tʃəmtʃ a	tʃəmtʃ a	tʃəmtʃ a	tʃəmtʃ a
-mp <sup>h</sup> -	gawn	झुम्फ र	dʒ <sup>h</sup> ʊ mp <sup>h</sup> ər ə	dʒ <sup>h</sup> ʊ mpər ə	dʒ <sup>h</sup> əm p <sup>h</sup> ər ə	dʒ <sup>h</sup> əm pər ə	dʒ <sup>h</sup> əm pər ə	dʒ <sup>h</sup> əm pər ə	dʒ <sup>h</sup> əm pər ə	dʒ <sup>h</sup> əm pər ə
-mb <sup>h</sup> -	seriou s	गम्भी र	gəmb <sup>h</sup> irə	gəmbɪ rə	gəmb <sup>h</sup> irə	gəmb <sup>h</sup> irə	gəmb <sup>h</sup> irə	gəmbɪ rə	gəmb <sup>h</sup> irə	gəmb <sup>h</sup> irə
-md <sup>h</sup> -	explai n	स म्झा	səmd ʒ <sup>h</sup> əʊ	səmd ʒa	səmd ʒa	səmd ʒa	səmd ʒa	səmd ʒa	səmd ʒa	səmd ʒa

		उ								
-md fi-	father- in-law	सम्धि	səmd <sup>h</sup> i	somdi	di	səmd <sup>h</sup> i	somd i	səmdi	somd i	somd i
-ntʃ <sup>h</sup> -	people	मान्छे	mantʃ e	məns ə	məns ə	mansə	mant ʃ <sup>h</sup> ə	mansə	mant ʃ <sup>h</sup> ə	mantʃ e
-ms -	demoli- tion	विध्वं स	bid <sup>h</sup> o msə	bid <sup>h</sup> o ŋsə	bid <sup>h</sup> o ŋsə	bid <sup>h</sup> oŋ sə	bid <sup>h</sup> o ŋsə	bid <sup>h</sup> oŋ sə	bid <sup>h</sup> o nsə	bid <sup>h</sup> o nsə
-st-	similar	जस्तै	dʒəstə i	dʒəss əi	dʒəss əi	dʒəssə i	dʒəst oi	dʒəssə i	dʒəss əi	dʒəst əi
-sd-	Sitting	ब ढला	bəsda	bəth <sup>h</sup> a	bəth <sup>h</sup> a	bəth <sup>h</sup> a	bəsda	bəssa	bəssa	bəsda
-st <sup>h</sup> -	Surna- me	अव स्थी	əwəst hi	ot <sup>h</sup> t <sup>h</sup> i	ot <sup>h</sup> t <sup>h</sup> i )	ot <sup>h</sup> t <sup>h</sup> i	osti	ot <sup>h</sup> t <sup>h</sup> i	ot <sup>h</sup> t <sup>h</sup> i	osti
-tʃk-	grab	प क्का	pətʃka	pətʃka / pətka	pətʃk a/ pətka	pətʃka / pətka	pətʃk a	pətʃka	pətʃk a/ pətka	pətʃk a
-d <sup>h</sup> t-	extra	ब ढता	bəd <sup>h</sup> ta	bərtā	bərtā	bərtā	bərtā	bərtā	bərtā	bəd <sup>h</sup> ta
-d <sup>h</sup> d -	growi- ng	ब ढदा	bəd <sup>h</sup> d a	bəddā	bədd a	bəddā	bərdā	bərdā	bədd a	bəddā
-mn -	roam	घुम्नु	g <sup>h</sup> om nʊ	g <sup>h</sup> om dʊ	g <sup>h</sup> om dʊ	g <sup>h</sup> omd ʊ	g <sup>h</sup> om dʊ	g <sup>h</sup> om mə	g <sup>h</sup> om mʊ	g <sup>h</sup> om nʊ
Equal Sonority Sequences										
-nm -	birth	जन्म	dʒən mə	dʒən mə	dʒən mə	dʒənə mə	dʒən əmə	dʒən mə	dʒən əmə	dʒən mə
-pt-	week-l ong	सप्ता ह	səpta fiə	səpta: :	səpta :	səptafi a	səpta fia	səpta: :	səpta :	səpta: :

-tk-	lad	जा क	dʒatk ə	dʒatk ə	dʒatk ə	dʒatək ə	dʒatə kə	dʒatkə	dʒatə kə	dʒatk ə
-kt-	piece	चो क्टो	tʃoktɔ	tʃoktɔ	tʃokt o	tʃoktɔ	tʃokt o	tʃoktɔ	tʃokt o	tʃoktɔ
-ptʃ-	padlock	क प्चा	kəptʃa	kəbdʒ a	kəbd ʒa	kəbdʒ a	kəbd ʒa	kəbdʒ a	kəbd ʒa	kəbdʒ a
-bdʒ-	capture	क ब्जा	kəbdʒ a	kəbdʒ a	kəbd ʒa	kəbdʒ a	kəbd ʒa	kəbdʒ a	kəbd ʒa	kəbdʒ a
-kd-	can	स क्टो	səkdo		səgd o	səgd o	sək d o	səgd o	səgd o	səkdo
-tʰ-	stick	लट्टी	ləttʰi	ləttʰi	ləttʰi	ləttʰi	ləttʰi	ləttʰi	ləttʰi	ləttʰi
-ttʰ-	slate	पत्थर	pəttʰe rə	pəttʰe ərə	pəttʰe ərə	pəttʰe rə	pəttʰe rə	pəttʰe ərə	pəttʰe rə	pəttʰe rə
-ddʰ-	Bouddha	बौद्ध	bəudd ʰə	bəudd ə	bəud də	bəudd ə	bəud də	bəudd ə	bəud də	bəud də
	worm	गद्धे	gəddʰ e	gəddʰ ʰe	gəddʰ dʰe	gəddʰ e	gəddʰ ʰe	gəddʰ e	gəddʰ ʰe	gəddʰ ʰe

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