



Typography, Sensitivity and Fineness'

<http://www.typoday.in>

Sensitive Role of Modifiers (Matras) in *Devnagari* Fonts

Author: Rajeev Prakash, Art Director, Delhi Press, New Delhi, E-mail: rajeevfontwala@gmail.com

Co author: Aarati Prakash Khare, Research Scholar, IIT Delhi, E-mail: aaratipkhare@gmail.com

Abstract: At present Devnagari texts are written in large volume in different media like newspapers, magazines, office documents, text books, internet, Electronic media and devices like mobile platforms. It is the responsibility of typographers and type designers to provide a perfect readable Devnagari font for this purpose. A perfect readable Devnagari font must have some salient qualities such as beautiful shape, fine joineries, minimum complexity, best possible optical character spacing, beautifully designed conjuncts and punctuation marks.

This paper discusses the sensitive role and importance of *Matras* or modifiers in Devnagari typeface and complex Devnagari script. It presents the detailed analysis of placement of *Matras* in various stages of evolution of documentation technology. As a typeface designer, typeface businessman and presently as Art Director in Delhi Press where 39 magazines are being published in 8 vernacular languages, the author has realized that it is not possible to provide the aesthetic text to readers without giving perfect respect to the *Matras*. The paper also proposes solutions for the problems faced by the type designers, text composers and readers of Devnagari text by suggesting proper placement of certain *Matras*.

Key words: *Devnagari, Typeface design, Modifiers (Matras), Spacing, Aesthetics, Unicode.*

1. Introduction

Devnagari script is known as complex script in language computing field. *Matras* play a vital role to make it more complex. But imagine a paragraph of Devnagari text without *Matras*. It looks like a bride without jewellery. *Matras* in Devnagari text are like creepers wrapped on the tree. Devnagari has different types of *Matras*. They are placed before, after, above and below the consonants (कं कि की कु क्) and conjuncts (क्रं क्कि क्की कु). In some cases multiple *Matras* are also placed with consonants (कुं केँ कुँ), horizontal conjuncts

(विक्रि विक्रि) and vertical conjuncts (विक्रि विक्रि). *Matras* on suitable position can be formed if type designer has taken proper care of it.

The use of Devnagari has changed over the time for documentation purpose as per various means like handwriting, old Manuscripts, hot metal, digital typesetting, DTP, websites, portable devices like tablets to mobile phones. The present paper discusses the importance and sensitive role of matras in Devnagari script. The basics of Matras in Devnagari has been discussed in section2. The analysis of placement and shapes of Matras of Devnagari in different era of documentations has been discussed in detail in sections 3. Section 4 consists of solution and proposed placement of certain Matras in some complex scenarios.

2. Basics of Matras

Classification of Devnagari has been done by S V Bhagwat, Bapu Rao Naik and Mahendra Patel. They classified Devnagari keeping in view hand writing, printing and fonts design. They have defined the grid and terminology of Devnagari. See figure 1.[2]



Figure.1 Grid and nomenclature.

Terminology of Devnagari Matras.[2]

Character	Sign	Nomenclature
	्	Halant
आ	ा	Kana
इ	ि	Short, hrasva velanti
ई	ी	Long, dirghavelanti
उ	ु	Short, hrasvaukar
ऊ	ू	Long, dirghaukar
ऋ	ॠ	Single prithvi sign, hrasvaRukar
ॠ	ॡ	Double prithvi sign, dirghaRukar
ऌ	ॢ	Single klpti sign
ॣ	ॣ	Double klpti sign
ए	े	Single matra
ऐ	ै	Double matra
ओ	ो	Kana matra
औ	ौ	Kana double matra
अं	ं	Anuswar
अः	ः	Visarga
	ँ	Anunasika, Chandrabindu

	ँ	Chandra
	ऽ	Avagraha
र	प्र ढ़	Ra-kar (short slanted line)
र	ऋ	Rashtra sign (chevron shaped sign)
र	र्ष ढ़	Reph, Rafar

2. Aesthetics in Devnagari Matras

Aesthetics in font can be described as the beauty of the fonts. Not only Matras but the curves of letter forms play a vital role to give a good feeling to the reader. Fonts also express the feeling about the written content but solely depending upon the user's eye and ability to read clearly especially in smaller point size. As per C. Morris's view on art[3], Art communicates intrinsic value. The artist finds his work as a stimulus pattern that have pleasing effect on nervous system. The ancient Greek philosopher Socrates favored the idea of "beautiful-good". Plato (in the Statesman) wrote about arts, all arts can be judged against excess and deficit. Aristotle (*in the Nicomachean Ethics*) cleared the above said point with impeccable conciseness "A masters of any art avoids excess and deficit but seeks the intermediate and chooses this." [1]

It is true and applicable in the field of font design and typography. In font design designers need to balance between the excess and the deficit.

3. Journey of documentation in India

The use of Devnagari has changed over the time for documentation purpose as per various means like handwriting, old Manuscripts, hot Metal, digital typesetting, DTP, websites, portable devices like tablets to mobile phones. The analysis of placement of Matras for these is discussed below.

3.1 Handwriting and Calligraphy Era

Handwriting has tremendous freedom to express thoughts through letterforms. We form the Matras without any limitations while writing a text. It can be formed in any style and also play a vital role to beautify the text. In one sentence same Matra can be formed in different styles also.

हिंदी शब्दों की लिपी राष्ट्रिय नस्ल जागतिक संपर्कालिपी व जगन्ने-पाठ्ययुक्त
 आभसी खिडकीच झाली आहे, अरबी-फारसी-उर्दू ही शैजालिपी झाली आहे,
 गभीर संपर्कालिपी "पारिवर्धित देवनागरी" ही अपभ्रंशपूर्ण होऊन वसली
 आहे आणि प्रांतीय स्वरुपाचे वारन म्हणून स्थानिक लिप्यां याही शिकणे
 आवश्यक आहे. एकबेल अनेक भाषा शिकणे, त्यांतिल अर्थ-शिक्षणानुळे कठीण
 असले (कारण शब्दसंख्या हजारोंच्या धरांत असते, परंतु अनेक लिप्या
 शिकणे तेवढे करीण नाही. लिपीचा संबंध केवळ नैसर्गिक ध्वनीशी असतो
 आणि मूलध्वनी शंभराहून आधीक नसतात. त्यांत सुद्धा पायाशुद्ध व
 तुलनात्मक अभ्यासाने लिप्या शिकणे तेवढे करीण नाही, हे लक्षांत
 घेतले पाहिजे.

गेली व तयें अक्षर-परिचयाना छंद, सुलेखन, आरेखन, अक्षर-रचना,
 संशोधन, कलाशिक्षणाचा अनुभव आणि शिक्षण-सल्लागार आदि पासून
 खालील प्रयोग पावच्या मांडल्या आहेत -

पाथरी पाहिली I - चिनी ही भानाचिनात्मक लिपि खेडरी तर जगांतीक

Figure.1 An example of free use of same Matras.

3.2 Manuscript Era

Manuscript era was the classical period of documentation. In old manuscripts Devnagari script has been used beautifully. My analysis of these manuscripts brings out the following points:

- Designers have given emphasis on X-height characters in proportion to Ascender and Descender.
- In general, in the first line of the page upper Matras are more visible but in next lines upper Matras are formed in small size so they are less visible.
- Lower Matras are more emphasized than upper Matras. Sometimes lower Matra starts above the base line and is hardly visible. In this case related consonants are designed in smaller size than the normal consonants. Even though less space has been given to Matras but very beautiful manuscripts have been designed from visual and reading point of view.

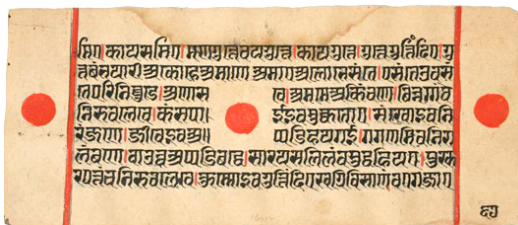


Figure.2 An example of importance given to X-height as against Matras

3.3 Hot Metal Era

Hot metal era can be termed as an era of exponential growth for font design with very innovative work done in various parts of India. Many publishers including British took keen interest to publish quality printing books. There was a huge market of religious, social, text books and news papers. Besides British many other printers and publishers also

published good books in Hindi and Marathi languages. Nirnaya Sagar Press and Type foundry has produced very high quality Devnagari fonts for printing purpose. These fonts are being used as reference material for contemporary type designers, researchers and students. Nirnaya Sagar Press has cast amazing Devnagari fonts in various styles for various purposes in different point sizes. These fonts are of very high quality in terms of visibility and readability. In Nirnaya Sagar fonts, Matras have been designed beautifully with typographic tricks. A few examples depicting the beautiful placement of Matras are given below. An excellent example of beautifully placed Matra is shown in figure 3 where Ukar Matra is beautifully shifted upward into baseline and it looks as a part of the related consonant. It is an Akhand character.

Figure. 3 An example of beautifully placed Matra in Nirnaya Sagar fonts.[4]

Figure 4 shows an example where Upper Matras are very well placed and have been given proper emphasis in Nirnaya Sagar font

Figure. 4 An example of proper placement of Upper Matras.[4]

Though hand composing had many merits, it had some drawbacks also. In some places same Matras are placed in two different styles for the text. In Figure 5 the Matra on 'य' has appeared two times but both Matras are different. It was the basic problem in hand composing letter press.

Figure.5 An example of non uniformity of matra placement in hand composing.

3.3 Early Typesetting Era

Linotype, Monotype, LazerComp and Compset etc. typesetting companies entered in Devnagari text composing field in this era. In digital typesetting era Matras were not taken care of properly by most of the companies but Monotype and Linotype have provided remarkable types and Matras were designed beautifully in their Devnagari typefaces.

भिड़ों

Figure 6 Rare case of chopping a consonant to form ङ

3.4 Desk Top Publishing

Around 1984 Desk Top Publishing opened the doors for type designers to show their expertise of type designing. During this time linguistics, type designers and technocrats worked together and understood the intricacies of technology and Devnagari script. Luckily this work was being done in India mostly by Indian companies. In DTP there were lots of advantages but several limitations also. The Main limitation was that of number of codes. There were only 186 usable codes for whole Devnagari script. With this crisis of codes, designers had to accommodate all the consonants, vowels, conjuncts, punctuation marks and Matras. Some of the observed problems of placement of Matras DTP area listed below:

- (i) In Devnagari, Matras are placed at left, right, top and bottom parts of the consonants and conjuncts. Devnagari has multiple consonants and conjuncts of different widths. Due to lack of codes in DTP technology designers had to use same Matra in all different width characters. For example in रि सि झि कि क्कि स्क्कि same Matra was used for different width characters.
- (ii) For some Indian language DTP providers assigned single Anuswar for multiple Matras and consonants like कं कां कै के कि कि की की कं को को को को. This single Anuswar generally overlapped with Matras and it was not comfortable in reading and the visual appearance was also very bad.
- (iii) Matra ँ and ु is not placed on the center stem of क (fig.7).



Figure 7

- (iv) Placement of े Matra in conjunction with ं is overlapped.
- (v) Single Rakar and Ref were assigned for Multiple Matras and consonants like कृ कृ कृ मृ कं कि कि की की के के के के को को को को. Rakar, Ref and other Matras were also overlapped with each other in Devnagari DTP.

4. Unicode the Solution for Indian Languages font design

Indian Language typeface codes were not standard before incorporating Indian Languages in Unicode. Unicode solved the problem of number of codes. Now in Unicode, type designers can design Matras according to the width of Consonant and Conjuncts. But just having large number of codes is not sufficient for proper font design. Proper emphasis should be given to the placement of Matras while designing the fonts. Matra should be designed in different width and shape. Some of the proposed suggestions for Matras and their combinations in case of र, क and क्क are as following:

- (i) Kana Matra should appear just after consonant or conjunct. Kana Matra should not be in the center of two characters. It should be slightly closer to the previous character because it is the part of previous character.



Figure. 8 Placement of Kana Matra.

- (ii) Width of Anuswar should be slightly more than the thickness of vertical stem of Kana Matra.

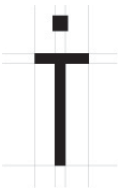


Figure. 9 Width of Anuswar.

- (iii) ि Matra should touch the vertical stem of क (fig.10). The placement of ि matra in right hand side is proper.



Figure.10 ि Matra touching the vertical stem of क.

- (iv) ि Matra with conjunct character should touch the vertical stem of main consonant as shown in fig. 11



Figure.11 ि Matra with conjunct character.

- (v) Combination of े and ं in कै should be perfect as shown in the right hand side of fig 12.



Figure.12 Right image has perfect placing and combination of कै.

- (vi) Extreme right image in following fig 13 is the proper example of ु Matra. Right and left curves of क and ु Matra is shifted upward.



Figure. 13 Placement of ु Matra.

4. Conclusion

Font designing for Devnagari font has come a long way from the era of hand writing, calligraphy, hot metal, early typesetting to DTP and finally Unicode technology with its merits and demerits. Though Unicode technology is very helpful but it is very challenging and painful process for type designers. Designers should take full advantage of availability of large number codes and design Matras in different widths and shapes according to the corresponding Consonants and Conjunct. Some placements of Matras in case of र, क and क्क have been proposed in this paper. There is further scope of research and design in this direction.

5. References:

1. Berlyne D. E., *Aesthetics and psychobiology*, University of Toronto, 1971.
2. Dalvi Girish, *Anatomy of Devanagari Typefaces*, Doctoral thesis, 2008.

3. *Morris .C., Esthetics and the theory of signs. Journal of Unified Science (erkenntnis), 1939, 8, 131-150*

4. *Shubhashit Ratnabhandagaram from Nirnaya Sagar Press, 1952.*