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COMPARATIVE STUDY OF PAIN THRESHOLD AT MARMA (VITAL POINTS) AND SITES OTHER THAN MARMA

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ABSTRACT

Ayurveda has described 107 *Marmas* (vital points) on the whole body surface. These *Marmas* are very delicate and sensitive points constituted with special types of tissues which can be easily exposed to any injury or trauma. The definition quoted by *Acharya Vagbhata* is based upon *Ruja* (pain) which is somewhat different view. Modern science also believes that the typical mechanism involving sensitivity, action potential, pain threshold are responsible to elicite the pain. In the present study, the *Ruja* (pain) is evaluated with regards to pain threshold by applying pressure stimulus. For this study, 60 healthy, normal volunteers were selected. The *Marma* on upper extremity of these volunteers were considered as group 'A' whereas the sites other than *Marma* on upper extremity were considered as group' B'. An experimental study was carried out in group A and B with the help of sphigmomanometer tied around specially designed wooden object. The reading on sphigmomanometer when pain is elicited by pressure, is considered as pain threshold. It has been observed that the pain threshold in group 'A' are less in all individuals than in group 'B'. The lesser pain threshold at *Marmas* may be due to aggregation and sensitization of nocireceptors responsible for pain stimulus than sites other than *Marma*. Hence, we can say that these are very delicate and sensitive points and must be avoided from any injury or trauma.

Key Words: *Action Potential, Ayurveda,Marma, Nocireceptor, Pain threshold, Ruja*

INTRODUCTION:

Acharya Sushruta,[1] *Acharya Charaka*[2] and *Acharya Vagbhata*[3] have described *Marma* science with respect to definitions, types, *Marmabhighata lakshanas* (traumatic effects) and their *Pramanas*. These points are located on the whole body surface in superficial or deep manner. Traumatic effect on *Marma* may be local or systemic. Injury also predisposes delay healing or recovery,

partial or complete deformity at traumatic area. According to *Ayurveda,* it is because of presence of '*Prana*'[4] (vital energy) at that area.

Acharya Sushruta and Vagbhata have mentioned *Samanya Marmabhighata lakshanas* (general traumatic signs) as *Bhedan* (rupture), *Daran* (laceration)[5] and *Guruta* (inability to perform the function) *Sammoha* (sensory impairment), *Dehaprasupti* (drowsiness)[6] respectively. These *Lakshanas* are totally depend upon prognostic type of *Marma*. *Rujakar Marma*[7] is one of the prognostic types of *Marma* where *Ruja* (pain) is more significant. But *Acharya Vagbhata* focused *Vishama Spandana*[8] and *Ruja*[9] as a premium and basic signs in of *Marma. Vishama spandana* i.e .altered pulsation is an indicator of arterial pressure. '*Pidite Ruka'* i.e. pain on pressure is because of highly aggregated nocireceptors at that area. The present study was planned to compare pain threshold at *Marma* and sites other than *Marma.*

Aims and Objectives:

1) To compare the pain threshold at *Marma and* sites other *than Marma.*
2) To evaluate the importance of definition of *Marma as 'Pidite Ruka'* (Pain on pressure) mentioned by *Acharya Vagbhata.*

Material and Methods:

The present study was carried out on 60 healthy and normal volunteers selected from 1st BAMS to 3rd BAMS from PMT's Ayurved College, Shevgaon, Dist. Ahmednagar.

Exclusion criteria:

1) Physically handicapped candidates.
2) The students having fractures of upper extremity.
3) The students complaining any pain at any part of upper extremity.

To compare pain threshold, *Marma* and sites 2 to 5 cm proximal or distal to *Marma* on upper extrimities were selected. Pain threshold at *Marma* considered as group 'A' and pain threshold at sites other than *Marma as* group 'B'.

In group 'A' we have selected following *Marmas*[10].

Table: 1

Sr. No.	Name of *Marma*	Location	*Anguli parimana*
01	*Talahridaya*	In the line of middle finger at palm	*½ Anguli*
02	*Kurcha*	Above *Kshipra marma*	*04 anguli*
03	*Kurchashir*	Below wrist joint	*02 Anguli*
04	*Manibandha*	At wrist joint	*02 Anguli*
05	*Indrabasti*	In between wrist and elbow joint	*½ Anguli*
06	*Kurpara*	At elbow	*03 Anguli*
07	*Ani*	03 *Anguli* above elbow joint	*½ Anguli*
08	*Bahavi*	In midpoint of arm	*01 Anguli*
09	*Lohitaksha*	Above *Bahavi marma* and below the shoulder joint.	*½ Anguli*

These *Marma* points were selected with the help of *Anguli* (digits) *Parimana*. As the criteria 'pressure' selected as a stimulus, at every *Marma* it has been created by specially designed wooden object along with the cuff of sphigmomanometer which was tied around the object. The bulb was pumped to increase the pressure and the reading was recorded when an individual just started to complain the pain. This reading was considered as pain threshold for that particular *Marma.* For maximum accuracy, the procedure was repeated thrice and mean was calculated. To avoid the compression injury, the pressure was released immediately after the pain complaint. The same procedure was repeated for group 'B'.

The readings of pain thresholds at *Marma* are considered as group 'A' while the readings of pain threshold other than *Marma* are considered as group 'B'.

Observations: Pain threshold in Group A and Group B:

Table: 2

Sr. No.	Name of *Marma*	Range of pain threshold (mm of Hg)	
		At *Marma* (Group A)	**Other than *Marma* (Group B)**
1.	*Talhridaya*	150-168	170-188
2.	*Kurcha*	130-160	178-188
3.	*Kurchashir*	140-150	166-187
4.	*Manibandha*	130-158	182-195
5.	*Indrabasti*	174-189	197-211
6.	*Kurpara*	140-150	162-176
7.	*Ani*	176-195	193-219
8.	*Bahavi*	140-169	175-188
9.	*Lohitaksha*	162-176	190-210

All above observations regarding pain thresholds in both groups were analyzed statistically by applying paired't' test.

Statistical Analysis of pain threshold in group 'A' and group 'B'

Table: 3

Sr. No	Group A		Group B		S.D.	't'-value	'p' value
	Name of *Marma*	**Mean value of pain threshold**	**2 to 5 cm. distal or proximal to *Marma***	**Mean value of pain threshold**			
1.	*Talhridaya*	162	*Talhridaya*	180	3.84	36.73	>0.001
2.	*Kurcha*	140	*Kurcha*	190	7.14	54.34	>0.001
3.	*Kurchashira*	145	*Kurchashira*	178	5.0	51.56	>0.001
4.	*Manibandha*	140	*Manibandha*	190	7.43	52.63	>0.001
5.	*Indrabasti*	180	*Indrabasti*	205	4.78	40.98	>0.001
6.	*Kurpara*	145	*Kurpara*	170	5.27	36.76	>0.001
7.	*Ani*	185	*Ani*	210	5.84	33.33	>0.001

8.	*Bahavi*	155	*Bahavi*	180	8.44	22.12	>0.001
9.	*Lohitaksha*	170	*Lohitaksha*	200	6.09	38.46	>0.001

RESULTS

The average pain threshold at *Talhridaya Marma* was 162 mm Hg and for site, 2 to 5 cm proximal to the *Talhridaya Marma* was 180 mm Hg with a S.D ± 3.84. The difference observed was highly significant with 't' value being 36.73 and p value >0.001. The average pain threshold at *Manibandha Marma* was 140 mm Hg and 190 mm Hg was found at site, 2 to 5 cm proximal from *Manibandha Marma* with a SD of ± 3.84. Comparative assessment was statistically significant with 't' value of 52.63 and p value > 0.001. The mean value of pain threshold at *Kurchshira Marma* was 145 mm Hg and for site proximal 2 to 5 cm other than *Kurchshira Marma* was 178 mm Hg with a S.D. ± 5.0 and 't' value 51.56 which is statistically significant with p value > 0.001.The average pain threshold at *Kurcha Marma* was 140 mm Hg and 190 mm Hg was found at a site,2 to 5 cm distal from *Kurcha Marma* with a SD of ± 7.14. Comparative assessment was statistically significant with 't' value of 54.34 and p value > 0.001.

The average pain threshold at *Indrabasti Marma* was 180 mm Hg and 205 mm Hg was found at a site,2 to 5 cm distal from *Indrabasti Marma* with a SD of ± 4.78. Comparative assessment was statistically significant with't' value of 40.98 and p value > 0.001. The mean value of pain threshold at *Kurpara Marma* was 145 mm Hg and for site 2 to 5cm distal to *Kurpar*a *Marma* 170 mm Hg with a S.D. ± 5.27 and 't' value 36.76 which is statistically significant with p value > 0.001.The mean value of pain threshold at *Ani Marma* was 185 mm Hg and for site other than *Ani Marma* i.e. 2 to 5cm distally was 210 mm Hg with a S.D. ± 5.84 and't' value 33.33 which is statistically significant with p value > 0.001.At the site of *Bahavi Marma* mean value of pain threshold was 155 mm Hg and for site other than *Bahavi Marma* i.e.2 to 5cm proximally was 180 mm Hg with a S.D. ± 8.44 and 't' value 22.12 which is statistically significant with p value > 0.001.At the site of *Lohitaksha Marma* mean value of pain threshold was 170 mm Hg and for site other than *Lohitaksha Marma* i.e.2 to 5cm distally was 200 mm Hg with a S.D. ± 6.09 and 't' value 38.46 which is statistically significant with p value > 0.001.

DISCUSSION

The *Marmas* are supposed to be very delicate vital points spread over whole body surface. These points are very sensitive and whenever they are exposed to any trauma directly or indirectly (soft injury) they produce fatal signs and symptoms locally or systemically.

According to *Sushruta*, various traumatic effects are due to aggregation of special structures i.e. *Mamsa (muscle), Sira (vessels), Snayu (ligaments), Asthi (bones)* and *Sandhi (joints)* present at the site in more or less combination along with *'Prana'*. Different *Acharyas* have different opinions regarding the constitution of *Marma*. Apart from *Prana*, Ayurveda believes that *Agni, Soma, Vayu* also contribute to constitute the *Marma* and to elicit various injurious effects. As per modern science, vascular damage, ischemia, nerve damage predisposes the injurious effects.All above mentioned factors are responsible for its importance from surgico-anatomical view.

Acharya Vagbhata in his definition of *Marma* clearly mentioned the *Pidite Ruja* i.e. pain on pressure is main symptom of *Marma*. The sensitivity to the pain stimulus at *Marma* is assessed.

As per modern science, the pain is subjective matter and it varies from person to person. Pain is one of the protective mechanisms which provide ability to diagnose damaging phenomenon. Normally, pain impulse gets generated at free nerve endings termed as nocireceptors. These nocireceptors are widely spread in skin as well as in the internal tissues, responsible for detection of physical and chemical tissues damage. This pain stimulus can be understood when the pain felt by that particular individual and it is called the pain threshold.[11] General physiopathology of pain is as follows.

Stimulus ⟹ nocireceptor⟹ change in membrane electrical potential ionic ⟹ exchange ⟹ receptor potential ⟹ rise in receptor potential ⟹above thresholds actions potential⟹ impulse generation

When certain amount of pressure is exerted on *Marma*, there is definite either local compression or ischemia. The compression has been evaluated with regards to pain threshold, but we cannot assess or evaluate the ischemia with ease. Both these factors affect nocireceptors which may be crowded more at *Marma*. It subsequentely leads to pain sensation. Pain on pressure (*Pidite Ruja*) quoted by *Acharya Vagbhata* exactly coincides with the inferences obtained by the experiment.

CONCLUSION

1. Low pain threshold at *Marma* is suggestive of high sensitivity of receptors than sites other than *Marma.*
2. The symptom *Ruja* (pain) is not only restricted to *Rujakara Marma* but it is one of the common characteristics of *Marma..*
3. The presence of highly aggregated and sensitive nocireceptors may be the cause of *Ruja* at *Marma* mentioned by *Acharya Vagbhata..*
4. *Acharya Sushruta* classified *Kurcha, Kurchshira* and *Manibandha Marma* as *Rujakar Marma*. Result also indicates the least pain threshold at these *Marmas*.

REFERENCES

1. Sushurt Samhita of Sushrut with the Nibandhasangraha Commentry of Sri Dalhanacharya edited by Vaidya Yadavaji Trikamaji Acharya Published by Chaukhamba Surbharati Prakashan, Varanasi, Reprint 2008 *Page-287-295*
2. Charak Samhita, Vd Manorama Hindi commentry, first edition, New delhi, Chaukhamba Sanskrit Prakashan 2003 *Page -945-962*
3. Ashantagahridayam of Vagbhata edited with the Vidyotini Hindi commentary by Kaviraj Atridev Gupta edited by Vaidya Yadunandan Upadhaya published by chaukhamba Sanskrit Sansthana, Varanasi, 12th edition *Page-196-201*
4. Sushurt Samhita of Sushrut with the Nibandhasangraha Commentry of Sri Dalhanacharya edited by Vaidya Yadavaji Trikamaji Acharya Published by Chaukhamba Surbharati Prakashan, Varanasi, Reprint 2008 *Page-288*
5. Sushurt Samhita of Sushrut with the Nibandhasangraha Commentry of Sri Dalhanacharya edited by Vaidya Yadavaji Trikamaji Acharya Published by Chauk-

hamba Surbharati Prakashan, Varanasi, Reprint 2008 *Page-293*

6. Ashantagahridayam of Vagbhata edited with the Vidyotini Hindi commentary by Kaviraj Atridev Gupta edited by Vaidya Yadunandan Upadhaya published by chaukhamba Sanskrit Sansthana, Varanasi, 12th edition.
7. Sushurt Samhita of Sushrut with the Nibandhasangraha Commentry of Soi Dalhanacharya edited by Vaidya Yadavaji Trikamaji Acharya Published by Chaukhamba Surbharati Prakashan, Varanasi, Reprint 2008 *Page-289*
8. Ashantagahridayam of Vagbhata edited with the Vidyotini Hindi commentary by Kaviraj Atridev Gupta edited by Vaidya Yadunandan Upadhaya published by chaukhamba Sanskrit Sansthana, Varanasi, 12th edition *Page-198*
9. Ashantagahridayam of Vagbhata edited with the Vidyotini Hindi commentary by Kaviraj Atridev Gupta edited by Vaidya Yadunandan Upadhaya published by chaukhamba Sanskrit Sansthana, Varanasi, 12th edition *Page-198*.
10. Sushurt Samhita of Sushrut with the Nibandhasangraha Commentry of Soi Dalhanacharya edited by Vaidya Yadavaji Trikamaji Acharya Published by Chaukhamba Surbharati Prakashan, Varanasi, Reprint 2008 *page-292.*
11. A text book of Medical Physiology by Guyton and Hall 11th edition *page-598-606*.

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