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STUDY OF ANATOMICAL CHANGES IN SWIMMERS WITH SYMPTOMS OF AMSA MARMABHIGHAT

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ABSTRACTS
Ayurveda is a science which has described various concepts which are special and specific to maintenance of health and occurrence of disease. One Such concept is the Marma or the vital points in the body. Ayurveda categorizes them with the help of various aspects viz. by their fundamental constitution, their structural constitution, regional placement, dimensional classification and prognostic results based on the injury to those vital points. While most of the classifications cater to the physiological aspects the anatomical aspects of the classification are either basic or gross. The present study focuses on one such vital point the Amsa Marma and is an attempt to understand the concept of the various anatomical structures and the pathology in them in correlation with the various references mentioned in the Ayurvedic Literature. The research incorporates the study of swimmers who portray symptoms of Amsa Marmabhighaat (Injury to the Amsa Marma) due to its repetitive use in swimming. The findings are suggestive of a strong correlation between the concepts related to Amsa Marma as mentioned in Ayurvedic Texts and as collated through the imaging techniques deployed in these subjects. The Research also proves that symptoms of Amsa Marmabhighata do cause changes in the anatomical structures in the underlying shoulder joint.

KEYWORDS: Ayurveda, Marma, Amsa Marma, Marmabhighat, Structural Changes, Shoulder Joint, Impingement, Vaikalyakar Marma.

Aims & Objectives
1. Study the Structural Changes in Shoulder Joint with special reference to Amsa Marmabhighat in Swimmers
2. To study the Amsa Sandhi and Amsa Marma according to Ayurveda and Modern aspect
3. To find a correlation between Amsa Marmabhighat and the Sports Injuries faced by Swimmers

INTRODUCTION
It has been a general conception that Ayurveda which literally means the science of life has demonstrated strong evidences in the specific diagnosis and treatment part of diseases while lacks a detailed description of subjects like Anatomy and Physiology as relates to the current advancements in them. Many of the concepts in Ayurveda have been tried to be tested as per the benchmarks of the current advancements in medicine to prove an authentic correlation however the other side seems to receive fewer takers. The present study is an attempt to focus on the study one of the anatomical concepts of Ayurveda - Marma (the vital point).

According to Ayurveda our bodies are made of seven prime tissues, with each of which having a specific function. They are enumerated as Rasa, Rakta, Mamsa, Meda, Asthi, Majja, Shukra.[1] Out of these, the function of giving a specific structure to the body is done by Asthi.[2] The articulation of these Asthis in our body is particularly important to provide the virtue of mobility. This function is achieved with the help of the joints (the Sandhis). In Ayurveda a Sandhi is mentioned to be a junction where two or more body parts including bone meet or articulate with each other.[3] In the present context the focus shifts to the Asthi sandhis where two bones articulate, which is commonly known as a joint.

The Amsa Sandhi (Shoulder Joint) or the Gleno Humoral Joint is one such joint between the Scapula and the Humerus. It is the major joint connecting the upper limbs to the trunk. It is also one of the most mobile joints in the Human body, though at the cost of joint stability. There are two Amsa Sandhis (Shoulder Joints) in our body one connecting each arm to the trunk.[4] Incidentally the same area is also a seat of the Amsa Marma,[5] Amsa is a Vaikalyakar Marma[6] (Vaikalyakar - Causing temporary or permanent deformity) in which any injury may lead to loss of function or deformity.

The Amsa Marma is a Snayu Marma (a classification as per the dominating structures present in it which reasons out by the fact that a lot of musculature is present and supports the structures in the shoulder joint. A common way of injuring a Marma is by repetitive overwork of the area which can be seen in activities like painting, cutting grass, chaffing and sports like tennis, bowling and swimming.

Ayurveda mentions "Stabdhabahuta" as a symptom of injury to the Amsa Marma While the term "Bahuta" can be clearly understood as in or with the arm, the term "Stabdha as collated from various dictionaries has a variety of meanings ranging from tardy (slow to move or act), stubborn or obstinate (determination not to change one's position), stiff, slack (held tightly in position), senseless, rigid, paralyzed or immovable.[7] Correlating these two with their individual meanings, the term "Stabdha Baahuta" appears to be a range of conditions ranging from a very slow arm movement to a non desire in a person to move the arm where he holds the arm tightly in position to avoid any untoward movement and even a paralyzed or immobile arm.

The present research was an attempt to study swimmers with varied degrees of immobility of the shoulder joint ("Stabdhabahuta") and correlate their findings acquired from imaging to find out if there was any anatomical deformity found and if yes, which were the most common anatomical structures where pathology had occurred. This would help us correlate to the various structures of joint where the Amsa Marma can be said to be located.

MATERIALS AND METHODS

Patients who visited the OPD of Shalyatantra (Orthopedic) Dept of Yashwant Ayurvedic Medical College & Hospital were screened for the study.

1. Inclusion criteria

a. Base – Pain / Difficulty in Movement of Shoulder
b. Swimmers who swim for up to 7 hrs a week
c. Age group of 18 to 50 years
d. Gender : Male, Female & Transgender
e. History of pain / reduced mobility of Shoulder after swimming
f. Individuals who have undergone an MRI Scan for their complaints

2. Exclusion criteria

a. Known case of Diabetes, Arthritis, Congenital Anomaly
b. History of routine work which involves excess use of shoulder
c. Individuals with history of surgical intervention to the Shoulder joint
d. Individuals with history of shoulder joint injury / dislocation / frozen shoulder

3. Study design

a. **Study type -** Observational Study
b. **Sample size -** 50 subjects satisfying study criteria were selected
c. **Event -** Amsa Sandhi Marmabhighat presenting as stiffness or pain on movement
d. **Selection -** Random irrespective of their age, gender, religion, occupation
e. **Process -** Subjects were screened and identified as per study criteria

- Patient provided study information & consent taken
- Patient recruited, checked and CRF filled
- 3 Motion Tests Appley's, Painful Arc & Speeds Tests were performed
- Patient reports collected
- Collated data was analysed

OBSERVATION AND RESULTS

- **Distribution based on Pathological MRI findings in Rotator Cuff**

- In all 50 subjects (100%) Supraspinatus Tendinosis was present.
- In 26 of 50 subjects (52%) Bicipital Tendinosis was present.
- In 13 of 50 subjects (100%) Subscapularis Tendinosis was present.

- **Distribution based on Pathological MRI findings in AC Joint**

- In 21 of 50 subjects (42%) Sub-Acromial / Sub-Deltoid fluid was present.
- In 4 of 50 subjects (8%) AC Joint Arthrosis was present.
- In 1 of 50 subjects (2%) Osseus Spurring was present.

- **Distribution based on Pathological MRI findings in Joint Capsule**

- In 4 of 50 subjects (8%) Joint Capsule Thickening (JC Thick) was present.
- In 3 of 50 subjects (6%) Superior Gleno-Humeral Ligament Thickening (SGHL Thick) was present.
- In 1 of 50 subjects (2%) Medial Gleno-Humeral Ligament Thickening (MGHL Thick) was present.
- In 3 of 50 subjects (6%) Inferior Gleno-Humeral Ligament Thickening (IGHL Thick) was present.
- In 3 of 50 subjects (6%) Labral Tear was present.

- **Distribution based on Other Pathological MRI findings**

- **Bursitis**

- Sub-Acromial Bursitis was observed in 34 Subjects (Occurrence 68%).

- Sub-Coracoid Bursitis was observed in 14 Subjects (Occurrence 28%).
- Sub-Scapular Bursitis was observed in 13 Subjects (Occurrence 26%).

- **Miscellaneous Changes**

- Synovial Thickening was observed in 9 Subjects (Occurrence 18%).
- Cartilage Irregularity was observed in 4 Subjects (Occurrence 8%).
- Capsule Inflammation was observed in 14 Subjects (Occurrence 28%).
- GHJ Effusion was observed in 11 Subjects (Occurrence 22%).
- GHL Inflammation was observed in 3 Subjects (Occurrence 6%).

- **Rare Findings**

- AC Joint Arthropathy was observed in 5 Subjects (Occurrence 10%).
- Humeral head Subluxation was observed in 1 Subject (Occurrence 2%).
- Muscle Atrophy was observed in 1 Subjects (Occurrence 2%).
- **Overall Pathological Findings in the MRIs**
  Overall 22 structural changes were observed in MRIs which has been mentioned in the table below.

Table 1: Occurrence probability based on pathology in mri findings.

Sr.	Structural Changes in MRIs	Chance	Occurrence	Probability (%)
1	Supraspinatus Tendinosis	50	50	100%
2	Bicipital Tendinosis	50	26	52%
3	Subscapularis Tendinosis	50	13	26%
4	Fluid Accumulation	50	21	42%
5	Joint Arthrosis	50	4	8%
6	Bone Spurring	50	1	2%
7	Capsule Thickening	50	4	8%
8	Sup. GHL Thickening	50	3	6%
9	Med. GHL Thickening	50	1	2%
10	Inf. GHL Thickening	50	3	6%
11	Labral Tear	50	3	6%
12	Sub Acromial Bursitis	50	34	68%
13	Sub Coracoid Bursitis	50	14	28%
14	Sub Scapular Bursitis	50	13	26%
15	Synovial Thickening	50	9	18%
16	Cartilage Irregularity	50	4	8%
17	Capsule Inflammation	50	14	28%
18	GHJ Effusion	50	11	22%
19	GHL Inflammation	50	3	4%
20	AC Joint Arthropathy	50	5	10%
21	Humeral Head Subluxation	50	1	2%
22	Muscle Atrophy	50	1	2%

Statistical analysis

The study started with the following two hypotheses:

H0 = Null hypothesis, Amsa Marmabhighaat (Sports Injury) during swimming does not show any significant anatomical change in the Amsa Sandhi (Shoulder Joint)

H1 = Alternate hypothesis, Amsa Marmabhighaat (Sports Injury) during swimming shows significant anatomical changes in the Amsa Sandhi (Shoulder Joint)

Therefore for the Alternate Hypothesis to be proven that swimming injuries which can be correlated to Amsa Marma Abhighaat show significant anatomical changes in the shoulder joint the Null Hypothesis had to be rejected.

Therefore the Chi Square test to check the association of the symptoms found in the subjects against the prevalence values in patients who have non traumatic shoulder pain. Yates Correction was applied in those observations where the frequency was below 5. A Chi square value more than 5 was counted as significant. A Chi square value less than 5 was counted significant. The Degree of Freedom for each calculation was 1. The references of the said prevalence were derived from various previous studies. Some of the references are derived values from similar occurrences their reference is clearly mentioned as 'Ref' in the prevalence rate below. For those findings in which reference values couldn't be derived due to lack of any reference material which could mention prevalence data, "NO Data" has been mentioned.

Table 2: Statistical analysis of the observations.

Sr.	Pathological Findings	Preval.	Obs.	X^2	Significance	P Val.
1	Sub Acromial Bursitis	1.3%	34	844.487	Significant	0.0001
2	Supraspinatus Tendinosis	1.8%	50	575.000	Significant	0.0001
3	Sub Coracoid Bursitis	1.3% (Ref)	14	277.800	Significant	0.0001
4	Sub Scapular Bursitis	1.3% (Ref)	13	237.741	Significant	0.0001
5	Bicipital Tendinosis	5%	26	232.526	Significant	0.0001
6	Capsule Inflammation	5%	14	55.684	Significant	0.0001
7	Fluid Accumulation	12%	21	42.614	Significant	0.0001
8	GH Joint Effusion	63%	11	36.057	Significant	0.0001
9	Labral Tear	55%	3	26.929	Significant	0.0001
10	Subscapularis Tendinosis	8% (Ref)	13	22.011	Significant	0.0001
11	Bone Spurring	40%	1	19.530	Significant	0.0001
12	Synovial Thickening	43.2%	9	12.940	Significant	0.0003
13	AC Joint Arthropathy	24%	5	5.373	Significant	0.0205
14	Joint Arthrosis	26%	4	4.536	Significant	0.3319
15	Cartilage Irregularity	17%	4	2.870	Non. Sig.	0.0902
16	Inf. GHL Thickening	4.3% (Ref)	3	0.351	Non. Sig.	0.5535
17	GHL Inflammation	1.6%	3	0.260	Non. Sig.	0.6098
18	Capsule Thickening	4.3%	4	0.177	Non. Sig.	0.6737
19	Sup. GHL Thickening	4.3% (Ref)	3	0	Non. Sig.	1.0000
20	Humeral Head Subluxation	No Data	1	-	-	-
21	Med. GHL Thickening	4.3% (Ref)	1	0	Non. Sig.	1.0000
22	Muscle Atrophy	6.7%	1	0	Non. Sig.	1.0000

DISCUSSION

Out of the 50 subjects studied all subjects had Supraspinatus Tendinosis; The supraspinatus muscle is a pennate muscle which externally rotates and adducts the Humerus, these movements are the main initiating movements during individual stroke of swimming. Repetitive use coupled with bulk movements against inertia put up a severe pressure on the muscle coupled with the fact that it is not a bulky muscle like the deltoid which later takes overwork of this muscle causes tendinosis (inflammation) and results in restricted movement of the tendon due to reduced subacromial space. The same may occur with other muscles of the rotator cuff and the same was seen in as incidence of Subscapularis Tendinosis in a few subjects.

As the tendons get inflamed and impinged below the bony structure there is increased friction in the area which cause the bursa to get inflamed and release of fluid in the intra structural space, eg. the space between muscles & tendons. This may also be exacerbated by the bony outgrowths (osteophytes) if present on the bony surfaces of the joint, thereby causing degeneration due to the increased friction. Findings in the matter were noted in the some of the subjects.

The shoulder joint is encircled by a loose fibrous capsule. It extends from the scapula to the humerus, enclosing the joint on all sides. The ligaments in turn strengthen the capsule and help it stay. On the posterior side the capsule blends in the glenoid labrum. Involvement of these structures is usually after a long standing occurrence of symptoms. So a few severe & cases were found to have Superior, Medial and Inferior Gleno humeral Ligament Thickening respectively. Some of them even had progressed to a stage of Labral Fraying (Tear).

Bursae are Fluid filled structures below the muscles & tendons which help their movement absorb the pressure and reduce friction however if ligament / muscle gets inflamed these structures are exposed to increased pressure and get inflamed. Bursitis was also observed in a moderate number of subjects. Some other types of findings which suggested a long standing disease viz. Synovial Thickening, Irregularity in the cartilaginous surface, possible inflammation of the Capsule, Effusion of the Gleno Humeral Joint and Inflammation of the Gleno Humeral Ligament were also observed in a few cases. Finally some rare occurrences like Acromio Clavicular Joint Arthropathy, Humeral Head Subluxation and muscle atrophy were also evident in a few cases which suggest a more severe type or long standing nature of the symptoms.

CONCLUSION

In the study which was exclusively carried in swimmers it was found that the structural changes were more focused in the superior portion of the shoulder joint especially the subacromial region with more than half of the pathological findings related to structural changes in the Supaspinatus Tendon (100%), Subacromial Bursa (68%) and Bicipital Tendon (52%). On a keen analysis of the top 10 anatomical changes viz. Supraspinatus Tendinosis (100%), Sub Acromial Bursitis (68%), Bicipital Tendinosis (52%), Fluid Accumulation (42%), Subcoracoid Bursitis (28%)

Capsule Inflammation (28%), Subscapularis Tendinosis (26%), Subscapular Bursitis (26%), GH Joint Effusion (22%), Synovial Thickening (18%) we can conclude that 8 out of these are either tendons or muscular structures or bursae which help the movements of these tendons. While 2 are effects of the inflammation of these tendons which can be correlated to the fact that Amsa Marma is a snayu Marma and an Abhighaat (injury) would be detrimental to the different snayu structures. The significant top 2 findings which had the most significant chi square values the Supraspinatus Tendinosis and Sub acromial bursa go a step further that they fall at the exact location where the Amsa Marma is said to be located. The midpoint between the bahu moordha (head of the arm – uppermost point on the arm) and the greeva moola (base of the neck – lowermost point of the neck). It is the area of the subacromial space where the most of the pathology occurs. The Findings of the study thus are consistent and significantly prove that Amsa Marmabhighaat causes Anatomical changes in the Amsa Sandhi (Shoulder Joint).

REFERENCES

1. Dr. Bramhanand Tripathi (Editor), Ashtanga Hridayam, Varanasi: Chaukhamba Pratishthaan, 2014; 11.
2. Dr. Bramhanand Tripathi (Editor), Ashtanga Hrudayam, Varanasi: Chaukhamba Pratishthaan, 2014; 160.
3. Dr. BG Ghanekar (Editor), Sushrut Samhita Shareersthan, Delhi: Meher Lakshmandas Publications, 2018; 164.
4. Dr. BG Ghanekar (Editor), Sushrut Samhita Shareersthan, Delhi: Meher Lakshmandas Publications, 2018; 165.
5. Shoulder Joint [Internet], Wikipedia.org, [cited 2020Mar9]; Available from: https://en.wikipedia.org/wiki/Shoulder_Joint.
6. Dr. BG Ghanekar (Editor), Sushrut Samhita Shareersthan, Delhi: Meher Lakshmandas Publications, 2018; 196.
7. https://www.learnsanskrit.cc/translate?search=स्तब्ध dir=se