



Review Article

CARPAL TUNNEL SYNDROME (CTS): WORK-RELATED MUSCULO-SKELTAL DISORDER AND ITS INTERVENTION IN AYURVEDA

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ABSTRACT

Today the desk/chair-hand combination became the cultural norm in the workplace. Typical seated worker has risk of musculo-skeletal disorders same as lifting heavy weights on job. CTS is one of the musculo-skeletal disorder and is due to overuse, strain, forceful or stressed motion of hand and wrist. Activities or jobs that require repetitive flexion and extension of the wrist may contribute such as computer work, sewing, writing, playing instruments, and driving for long duration. Its risk factors include RA or other wrist arthritis, Diabetes etc. In Ayurveda increase or vitiation of *Vata* results in compression and pain which is present in CTS. Ayurveda management of Carpal tunnel syndrome involves the management of vitiated *Vata Dosha*. The primary aim is to ease inflammation and pain by improving blood circulation and relaxing the muscles. In this regard, an attempt has been made to review the *Ganas* (Group of drugs) like *Vednasthapana*, *Daha-Shamaka* and therapies like *Basti*, *Swedna* mentioned in Ayurvedic classical texts and scientific journals which helps in management of symptom and eliminate the root cause of diseases.

INTRODUCTION

Musculoskeletal disorders (MSDS) cover any damage or disorder of the joints or other tissues in the back, upper limbs, lower limbs of the body. Musculoskeletal disorders result from biomechanical load, the force that the human body must exert to perform a task. Sitting is the new smoking. While this sound like ridiculously overblown media hype but sitting is more dangerous than HIV and is more treacherous than parachuting. Carpel tunnel syndrome is a common Musculo-skeletal disorder and is somewhat related with work. CTS is essentially a pinched nerve in the wrist. Carpel tunnel is a space that is present between the wrist where nine tendons and median nerve pass from the forearm into the hand. Swelling in this tunnel puts pressure on the median nerve which results in carpel tunnel syndrome. It was first described by Paget in 1854 [1].

It is a compressive neuropathy, which is defined as a mononeuropathy or radiculopathy that is caused by mechanical distortion produced by a compressive force[2]. Carpal tunnel syndrome can be the result of overuse, forceful, strain or stressed motions of hands and wrists. Research revealed that continuous typing, excessive usage of computers, etc, are the main cause for carpal tunnel syndrome. In 1998, in Europe, over 60% of upper limb musculoskeletal disorders recognized as work-related were CTS cases [3,4]. CTS is usually considered as a clinical entity with symptoms of pain in hand, unpleasant tingling, numbness with nocturnal exacerbations and clumsiness is reported during the day with activities requiring wrist flexion located mainly in median nerve distribution, i.e. index, thumb, middle and radial half of ring fingers[5]. Signs include Phalen's test (Wrist Flexion Test), Tinel's sign, sensory changes in distribution of median nerve.

Literary review in Ayurveda

According to Ayurveda the health is maintained by balancing of three *Doshas*. If any disturbance in this normalcy due to any work habit, food habit, seasonal change will lead to disease. So according to Ayurveda, *Vata Dosha* is the culprit *Dosha* in this particular condition of CTS. The characteristics like numbness, pain etc. are same as that of *Vata Dosha*. There is no disease which can be exactly compared with Carpal Tunnel Syndrome but based on *Hetu Sthana Vishesha*,

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CTS is a disorder of *Kapha Vata* vitiation. Considering the symptoms manifested, the pathogenesis can be formulated; as Acharya Caraka has described that depending upon the *Hetu Vishesh* and *Sthaana Vishesh*, the aggravated *Vaayu* produces various diseases. Chakrapani while commenting on this has explained that *Hetu vishesh* means because of specific nature of causative factors like occlusion by *Kapha* etc. and the site of affliction (*Sthaana*), vitiated *Vaata* produces specific diseases. Numbness is the primary feature present in Carpal Tunnel Syndrome. The exposure to *Kapha Prakopaka Aahaara* and *Vihaara* causes vitiation of *Kapha* and due to *Kha-Vaigunya* at *Manibanda Sandhi*, this vitiated *Kapha* starts causing obstruction to normal *Gati* of *Vaata* thereby favouring further *Vaata* vitiation. The exposure to *Kapha prakopaka aahaara* and *Vihaara* causes vitiation of *Kapha* and due to *Kha Vaigunya* at *Manibanda Sandhi*, this vitiated *Kapha* starts causing *Margaavarodha* to normal *Gati* of *Vaata* thereby favouring further *Vaata* vitiation and manifest as *Supti*, *Ruja* and *Shosha* at *Hastha*. Acharya Vaagbhata had described *Parsupthi* in which *Shleshma* aggravated *Vaayu* and when reach to the skin dries up and the skin sometimes becomes pale with loss of sensation with little or no itching and moistness [7]. So in this way the pathogenesis of CTS can be formulated in Ayurveda with the *Dosha* dominance as *Vaata-Kapha* and *Dooshya* are *Mamsa*, *Medas* with *Sthanasamsraya* at *Manibandha Sandhi*. So, as per considering Pathogenesis of CTS, *Kapha-aavrit Vaat Chikitsa* should be done initial stage. As *Rookshna* is the treatment of *Kapha-Aavrita Vaata* [8], it may prove fruitful but it should not disturb *Vaata* at the same time. As *Maargavrodha* of *Vaata* increases in later stage and both *Kapha*, *Vaata* increases equally on *Vikalapa Samprapti Snigdha* and *Ushana Chikitsa* should be done. For symptomatic relief of this diseases *Vaat shaamak Dravyas*, *Vednasthapana Dravyas* can be useful. *Taila* and therapies like *Basti*, *Swedna* mentioned in Ayurvedic classical texts which helps in management of symptom and eliminate the root cause of diseases.

MATERIAL AND METHODS

Method

Tabulation and compilation of herbs from *Vednasthapana ganas*, *Daha-shamaka ganas*, *Vaat Shamaka Taila* and possible treatment that can be used to treat CTS were reviewed from Ayurvedic literature and recent literature were also be analysed.

Material

In allopathy treatment of CTS falls under two categories: conservative and surgical. Conservative treatment is generally offered to patients suffering from mild to moderate symptoms of CTS. Options of such treatment include oral and non-steroidal anti-inflammatory drug (NSAIDs), oral steroids, Vit.B6 and Vit.B12, Yoga, carpal bone mobilisation and the use of hand splints.

Ayurvedic principles for management of CTS are namely:

1. *Nidanaparivarjana*
2. *Shamana*
3. *Shodhana chikitsa*

Nidana Parivarjana

Samanya Nidana of Vatavyaadhi: Habitual intake of *Katu*, *Tikta*, *Kashaya Rasa* (spicy, bitter and astringent foods), *Rooksha Bhojana* (fat free diet), *Ratri Jagarana* (awakening at nights), *Ati-Adhwa* (long distance walking), *Bhara* (lifting heavy weights) etc *Nidana* (etiology) leads to *Vata Kopa* and are most often associated with many of the *Vata Vyadhis*.

Specific Nidana for Vyana Vayuvyaadhi: *Atigamana* (long walk), *Dhyana* (excessive thinking), *Kreedha* (excessive sports), *Visama Chesta* (improper activity), *Virodhi* (incompatible foods), *Rooksha* (less nutritive food), *Bhya* (fear), *Harsa* (excitement), *Vishada* (depressed state), etc etiology will result in direct *Vyana Vayu Prakopa*[8], among the following the *Vishama cesta* (abnormal repeated activities) can be considered as specific for carpal tunnel syndrome, repeated activity or overuse as etiology is well documented in few studies.

Avoiding the aetiological factors mentioned above which causes vitiation of *Vatadosha* helps in management of CTS. Implementing of *Vatahara* lifestyle and diet along with yoga and exercise are also helpful in curing CTS. *Vatahara Aahara* and *Vihaara* are described here in Table 1.

Table 1: Vaatahara Aahara and Vihaara

Vaatahara Aahara and Vihara		
Regulate daily routine.	Stay warm in windy cold weather.	Reduce light, dry, cold food.
Reduce pungent, bitter and astringent tastes.	Early to bed and ample rest.	Warm cooked foods.
Massage at least 3 times a week (by sesame oil).	Stop activities that you feel are causing this, rest your fingers, hands and wrist.	Apply ice on your wrist for 10 to 15 minutes at a time.
Wear a wrist splint at night to keep it in neutral position	Soak your hands and wrist in warm to hot water for around 15 minutes before you go	Avoid sleeping on your hands.

and relieve pressure on the median nerve.	to bed each night as heat can also ease pain by relaxing the muscles.	
Avoid refined foods such as white bread, sugar.	Avoid caffeine (found in coffee and tea) and other stimulants like tobacco as they interfere with the peripheral circulation.	Stop consuming alcohol.
Include flax seeds, pumpkin seeds, and nuts as they are sources of omega 3 fatty acids which help in reducing inflammation.	Vegetables- Asparagus, Beets, Carrot, Cucumber, Garlic, Bean, Onions, Sweet Potato, Radishes, Turnip, Leafy Green	Fruits- Apricot, Avocados, Berries, Banana, Cherries, Coconut, Figs, Lemon, Grape, Mango, papaya, Plum, Apple, Sour Fruits.

Yoga for CTS

- Gomukhasana
- Garudasana
- Namaskarasana
- Prana-mudra

Shamana

The principle of *Shaman* therapy is to normalize the *Doshas*. According to Ayurveda classical literature many Ayurvedic formulations have been given to pacify the *Vata Dosh*.

In *Charaka samhita Daha Shamaka Gana* and *Vedanasthapana Ganas* are mentioned. [9] These drugs helps to pacify the symptoms caused by *Vaata*. Based on recent research *Daha-Shamaka* drugs are proved anti-inflammatory.

Table 2: Daha-shamaka and Vednasthapana drugs

Drugs	Latin name	Part used
Daha-Shamaka		
<i>Laja</i> (Fried paddy)	<i>Oryza sativa</i> L.	Seeds
<i>Chandana</i>	<i>Santalum album</i> Linn.	Heartwood, oil
Fruit of <i>Kashmarya</i>	<i>Gmelina arborea</i> Linn.	Root, fruit
<i>Madhuka</i>	<i>Madhuca indica</i> J.F.Gmel	Flower, seed, oil
<i>Sharkara</i>	Sugar	-
<i>Nilotpala</i>	<i>Nymphaea stellata</i> Willd.	Roots flower seeds
<i>Usheera</i>	<i>Vetiveria zizanioides</i> Linn.	Root
<i>Sariva</i>	<i>Hemidesmus indicus</i> R.Br	Root
<i>Guduchi</i>	<i>Tinospora cordifolia</i> Willd.	Stem
<i>Hribera</i>	<i>Pavonia odorata</i> Willd.	Whole plant
<i>Padmaka</i>	<i>Prunus cerasoides</i>	Bark, Seed Kernal

Vedanasthapana		
<i>Shala</i>	<i>Shorea robusta</i> Gaertn. f.	Bark, Resin
<i>Katphala</i>	<i>Myrica esculanta</i> Buch-Ham.	Stem bark
<i>Kadamba</i>	<i>Anthocephalus indicus</i> A. Rich.	Fruit, Stem bark
<i>Padmaka</i>	<i>Prunus cerasoides</i>	Stem bark, Seed
<i>Tumba</i>	<i>Xanthoxylon alatum</i> Roxb.	Stem bark, Fruit
<i>Mocharasa</i>	Resin of <i>Salmalia malabarica</i> Schott and Endl.	Resin
<i>Shirisha</i>	<i>Albizzi lebbeck</i> Benth.	Bark, seed, leaves flower
<i>Vanjula</i>	<i>Salix caprea</i> Linn.	Bark, Flower

<i>Elavaluka</i>	<i>Prunus cerasus</i> Linn.	Leaf, Resin
<i>Ashoka</i>	<i>Saraca indica</i> Linn.	Stem, Seed, Flower

There is no treatment better for *Vaataj* symptoms or diseases than *Taila*. So *Taila* from different ancient texts were tabulated. [Table 3]

Table 3: Taila given for Vaata-Shamana in various texts

Charak Samhita		
<i>Nirgundi Taila</i> (Ch.Su.28/134-135)	<i>Mulak Taila</i> (Ch.Su.28/136)	<i>Hasva Panchmool Taila</i> (Ch.Su.28/138)
<i>Yvadi Taila</i> (Ch.Su.28/140-141)	<i>Sehchar Taila</i> (Ch.Su.28/144)	<i>Shavdanstra trail</i> (Ch.Su.28/146-147)
<i>Bala Taila</i> (Ch.Su.148-156)	<i>Amritadya Taila</i> (Ch.Su.158-164)	<i>Rasna Taila</i> (Ch.Su.28/166)
<i>Mulkadya Taila</i> (Ch.Su.167-169)	<i>Vrismula Taila</i> (Ch.Su.170-171)	<i>Mulak Taila</i> (Ch.Su.172-175)
Shusruta Samhita		
<i>Anu Taila</i> (Su.Chi.4/28)	<i>Shatpaka Taila</i> (Su.chi.4/29)	
Sharangdhara		
<i>Lakshadi Taila</i> (Sha.M.9/93-98)	<i>Narayana Taila</i> (Sha.M.9/101-110)	<i>Bala Taila</i> (Sha.M.9/113-118)
<i>Prasarini Taila</i> (Sha.M.9/119-123)	<i>Mashadi Taila</i> (Sha.M.9/124-132)	<i>Dhatur Taila</i> (Sha.M.9/199-210)
Chakradutta		
<i>Eladi Taila</i> (Chakradutta 22/91-92)	<i>Blasheriye Taila</i> (Chakradutta 22/93)	<i>Bala tailam</i> (Chakradutta 22/94-103)
<i>Narayana Taila</i> (Chakradutta 22/104-114)	<i>Mahanarayana Taila</i> (Chakradutta 22/115-124)	<i>Mulkadya Taila</i> (Chakradutta 22/130-132))
<i>Rason Taila</i> (Chakradutta 22/133)	<i>Ketkyadya Taila</i> (Chakradutta 22/134-135)	<i>Saindhav Taila</i> (Chakradutta 22/136-137)
<i>Swalpmasha Taila</i> (Chakradutta 22/138)	<i>Kubjprasarini Taila</i> (Chakradutta 22/171-183))	<i>Trishatiprasarini Taila</i> (Chakradutta 22/184-187)
<i>Saptshatiprasarini Taila</i> (Chakradutta 22/189-198)	<i>Ekadashshatiprasarini Taila</i> (Chakradutta 22/199-204)	<i>Astadashshatik prasarini taila</i> (Chakradutta 22/205-226))
Rastantsara & Siddhprayoga Samgraha (Dwitya Khanda, Vaatvyadhi)		
<i>Mahamasha Taila</i>	<i>Sehcharadi taila</i>	<i>Himsagar taila</i>
<i>Panchguna Taila</i>		
Yogratnakar (Vaatvyadhi Nidanam)		
<i>Laghu Vishgarbh Taila</i>	<i>Maha Vishagarbha Taila</i>	<i>Prasarini Taila</i>
<i>Narayana Taila</i>	<i>Laghu Narayana Taila</i>	<i>Shatavari Narayana Taila</i>
<i>Shatavari Taila</i>	<i>Dashmooladi Taila</i>	<i>Sugandhin Taila</i>
<i>Eladi Taila</i>	<i>Mahalakshi Narayana Taila</i>	<i>Masha Taila</i>
<i>Mahabala Taila</i>	<i>Vijayabhairava taila</i>	<i>Rasnaputik Taila</i>

As per Ayurvedic texts many Ayurvedic formulations have been given to pacify *Vata Dosha*. [Table 4]

Table 4: Some Ayurvedic formulations to pacify Vata Dosha

Kashayam (Decoction)	Chooran (Powder)	Bhasma (Rasa preparation)
<i>Dashmoolkashayam,</i>	<i>Rasnadi Choorna</i>	<i>Brihatvaatchintamani Ras</i>
<i>Gandharvahastyadikashayam</i>	<i>Katphala Choorna</i>	<i>Ekangveer Ras</i>
		<i>Rajat Bhasma</i>

Vati (Tablet)	Asava & Arishta (Syrup)	Rasayana (immunomodulating drugs)
Yoga Raja Guggulu	Aswagandharishta	Chyvanaprasha Rasayana
Punarnavadi Guggulu	Dashmoolaristha etc.	Abhyaamalaki Rasayana
Shiv Gutika		

If not corrected at time, finally the vitiated *Vaata* overpowers the *Kapha* resulting in *Shosha* as evidenced by Thenar muscle atrophy in advanced cases of Carpal Tunnel Syndrome. And so in this stage *Snehana* with *Brihana Taila* like *Maha Masha Taila* along with *Salvana Upanaha* proves useful^[10].

Shodhan

In *Shodhana* elimination of morbid *Dosha* and *Dushya* is done from body through *Panchakarma* (purification therapy). Acharya Charaka described treatment protocol for *Vaatshamana*. *Snehapana* brings about *Sneha*, *Mriduta* and *Kleda* in the body. In order to prevent *Vataprakopa*, *Snehapana* is administered which is processed with *Katu*, *Tikta* and *Ushna Dravyas* which helps to alleviate *Vatadosha*. *Snehapana* can be done either in *Madhyam Matra*, as a *Poorvakarma* as well as in form of *Shamanartha Sneha*. *Swedana* process relieves stiffness, heaviness and results in perspiration. Liquefaction of *Dosha* in *Shakha* and their movement towards *Koshtha* for elimination is necessary which is achieved by *Swedan*. Use of varieties of *Swedan* like *Patrapotalipinda Sweda* and *Kayaseka* can be used to improve the mobility in wrist and fingers. All the Acharyas have appreciated *Basti* and consider it as primary mode of treatment in all *Vataja* disorders and due to its importance, *Basti* is called as "*Ardhachikitsa*". It expels the vitiated *Doshas* rapidly as well as it nourishes the body. *Avarana* is main causative factor in the pathophysiology of CTS. Thus, breaking this process of *Avarana* needs foremost consideration in its management. *Kshara Basti*^[11] as explained by *Bhaishajaya Ratnavali* 29/1 and *Vaitarana Basti*^[12] as explained by Chakradatta in *Niruha Adhikara* should be given.

CONCLUSION

For the past two decades, various researches have been done and still continue to understand the deadly impact of sitting too much. The typical seated worker has more musculoskeletal injuries or disorder than any other industry sector worker. It was claimed that for every hour we sit, we lose two hours of life^[13]. Our body adapt the position we assume for most of the day and our joints and tissues will form a sort of cast around that posture, making it difficult to get into better positions later. CTS is one of that musculo skeletal disorder. On review of literature, It was found that, most of the upper limb pathologies have been described under the category of *Vaata vyaadhi*. In Ayurveda no disease is exactly co-related with CTS. So Carpal Tunnel Syndrome cannot be equated to a particular disease condition in Ayurveda. It was found

that no Ayurvedic research works were done on management of Carpel Tunnel Syndrome so far. On the other hand, number of patients with CTS are increasing in daily medical practice due to work or other related causes. So, it is the time to elaborate management schedule of CTS. Proper pathogenesis, stage wise management of CTS should be considered from Ayurvedic perspective like *Dosha*, *Dushya*. Further clinical studies should be done to validate the pathogenesis of CTS according to Ayurveda. Also studies should be done on treatment aspect i.e., *Nidana Parivarjana*, drugs, oil and *Shodhan* therapy etc mentioned here for Carpel Tunnel Syndrome.

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