

## Full Length Research Paper

# Henna stained palms in patients with carpal tunnel syndrome (CTS)

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Carpal tunnel syndrome (CTS) is the most common diagnosed upper limb compressive neuropathy; though its diagnosis remains controversial. Some patients apply Henna (the extracts of the plant *Lawsonia inermis*) to their palms to relieve the symptoms. We don't know how common is this practice and if it does help in clinical diagnosis. The purpose of this study was to examine the diagnostic value of a new clinical sign; Henna sign (the application of Henna to the palms in patients with symptoms and signs of CTS in a trial to relieve their symptoms). The study group consists of 41 patients with 78 symptomatic hands. The diagnosis was based on a combination of history, clinical provocative tests and electrophysiological criteria, Compared to a control group of all patients who attended the clinic with typical signs and symptoms of CTS who had Nerve conduction study (NCS) to prove the diagnosis over 50 months period. Henna staining is not a common practice. Only 0.67% of patients who attended our clinic were diagnosed with typical symptoms of CTS and had nerve conduction study to prove the diagnosis that stained their hands with Henna. However the probability of having a positive NCS in Henna stained hands is higher than non stained hands.

**Key words:** Carpal tunnel syndrome (CTS), Henna, *Lawsonia inermis*, nerve conduction study.

## INTRODUCTION

Carpal tunnel syndrome (CTS) is the most often diagnosed compressive neuropathy of the upper limb, however the diagnosis of which continues to be clinically and neurophysiologically controversial. Its incidence is increasing gradually and it is anticipated that soon it will be second only to Low Back Pain for work related claimed disabilities in the developing countries (Syed et al., 2007). About 3 in 100 men and 5 in 100 women develop CTS at some point in their lives commonly between 45 to 60 years of age (Gadhav, 2011), although with prevalence remains variable in different populations.

CTS symptoms were first described by Sir James Paget in 1854; however up till now, the diagnosis remains

controversial. Diagnosis of CTS can be rather challenging due to the great variability of symptomatology and the presence of both false positive as well as false negative results of the variable clinical and non-clinical diagnostic tests used. The sensitivities of Phalen's wrist flexion test and Tinnels percussion test vary from 44 to 75% with specificities of 70 to 100% (De Krom et al., 1990; Durkan, 1991).

In patients with CTS, there are usually electrophysiological findings consistent with prolonged distal latency and delayed conduction velocity of either the sensory or motor component of the median nerve or even of both components as compared to normative data or to uninvolved nerves in the same patient. These findings

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**Table 1.** Classification of CTS according to nerve conduction study results.

<b>Normal values</b>	Sensory distal latency with a 16-cm distance between the proximal stimulating electrode and recording ring electrode over the proximal portion of the index finger—<4.2 ms Sensory amplitude (onset-peak)—>10 $\mu$ V Motor distal latency with an 8-cm distance between the proximal stimulating electrode and recording electrode over the muscle belly of the abductor pollicis brevis muscle—<4.2 ms Motor amplitude (peak-peak)—>3 mV
<b>Mild</b>	Sensory distal latency—4.2-5.24 ms Motor distal latency—4.2-5.24 ms
<b>Moderate</b>	Sensory distal latency—5.25-7.34 ms Motor distal latency—5.25-7.34 ms Sensory amplitude—<5 $\mu$ V
<b>Severe</b>	Absent sensory response— Motor distal latency—>7.35 ms

were reported by many authors to be the most accurate method for diagnosing CTS. Whereas, others argue that, electrophysiological testing is not necessary as a pre-operative diagnostic tool for patients with typical CTS (Szabo et al., 1999).

Henna, a traditional product with religious associations, has been widely used in Asia (India) and in the Middle East since ancient times as a hair, nail, and skin dye. Henna is a finely ground brown or green powder originating from dried leaves of the plant *Lawsonia inermis* which is grown in tropical zones, of North Africa (Sudan), India, and the Middle East.

The extracts of the plant exhibit a variety of biological activities such as antimicrobial, fungitoxic, anti-sickling, macrophage stimulating, analgesic, anti-inflammatory and anti-pyretic (Makhija et al., 2011).

We noticed that, some patients came to the clinic with the application of Henna to their palms as a treatment for their symptoms. We were under the impression that this is a new sign of CTS and a common practice in our part of the world. The purpose of this study was to see how common Henna is being used for such complaints and to examine the diagnostic value of Henna as a new clinical observational sign (Henna sign).

## MATERIALS AND METHODS

From June 2007 to August 2011, all patients who attended the Orthopedic clinic with a clinical picture of CTS and who had applied Henna to their palms were included in the study group. The study group consisted of 41 patients (40 females and 1 male) with ages ranging between 30 to 75 years with an average of 53.8 years.

Patient selection was based on the presence of classic symptoms (according to Katz criteria) (Katz and Stirrat, 1990) of CTS in Henna-stained hands, that persisted for more than 3 months period. 37 patients had bilateral hand involvement, 3 patients with right hand and the remaining patient had left hand involvement only.

Associated co morbidities included high blood pressure and diabetes mellitus in 11 patients, coronary artery disease in 3 patients and asthma in 1 patient. All patients had nerve conduction study for both upper limbs to prove the diagnosis, and the results were classified as normal, mild, moderate or severe (Table 1).

The diagnosis was based on a combination of positive:

- i) History.
- ii) Clinical provocative tests (namely Tinel's percussion test, Phalen's wrist flexion test and Durkan carpal compression test.
- iii) Electrophysiological testing.

The control group consisted of all other patients who attended the orthopedic clinic with clinical picture of CTS in the same period not applying Henna to their palms and had Nerve conduction study (NCS) for their upper limbs as part of their evaluation. A total of 6074 (1033 males and 5041 females) patients with ages ranging from 18 years to 93 years with an average of 58.27 years were included in this group. Patients with previous surgery, or wrist lacerations or fracture and patients with any cause of neuropathy other than diabetes mellitus were excluded.

## RESULTS

The results of NCS in the study group are shown in Table 2. All patients with a positive NCS underwent surgical release by the same surgeon under local anaesthesia and in case of bilateral disease, the operation was staged within a period of 3 months between each side and all of them achieved significant relief without complications.

All of the 2873 control patients who had a positive NCS were offered surgery, only 725 underwent surgical release. The results of NCS in the control group are shown in Table 3.

The results were analyzed using Cross tabulation and the Chi sq test, and a P value of < 0.05 was considered significant. The percentage of positive diagnosis among patient who uses Henna was (70.7%) and it is

**Table 2.** Nerve conduction study results (Henna group).

41 Patients applied Henna and had clinical picture of CTS	12 Patients had normal NCS (no disease).					
	29 Patients had Positive NCS (Had the disease)	8 Right side only		4 Mild	3 Moderate	1 Severe
		4 Left side only		3 Mild	1 Moderate	0 Severe
		17 Bilateral disease.	17 right 17 left	4 Mild	10 Moderate	3 Severe

**Table 3.** Nerve conduction study results (control group).

6074 patients had clinical picture (no henna)	3201 Patient had normal NCS					
	2873 patients had Positive NCS (Had the disease)	477 Right side only		202 Mild	242 Moderate	33 Severe
		222 Left side only		73 Mild	133 Moderate	16 Severe
		2174 Bilateral disease.	2174 Right 2174 Left	547 Mild 742 Mild	1196 Moderate 1094 Moderate	431 Severe 338 Severe

**Table 4.** NCS \* Henna cross tabulation.

			Henna		Chi sq	Odds ratio (95% confidence interval)
			No Henna	Henna		
NCS	Normal	3213	3201(52.7)	12(29.3)	8.97**	2.693 (1.37--5.29)
	Positive	2902	2873(47.3)	29(70.7)		

\*\* p &lt; 0.01

significantly higher than those who are not using Henna (47.3%) ( $P < 0.01$ ), those who do Henna were 3 times more likely to diagnose with positive nerve conduction, and the Odds ratio was 2.693, CI (1.37 to 5.29) (Table 4).

## DISCUSSION

The first clinical description of median nerve compression in the carpal tunnel goes back to 1854 (Carla et al., 2008), when Paget published two cases of compression of the median nerve within the carpal tunnel, one post-traumatic and one idiopathic, but it was only a century later that the term "carpal tunnel syndrome" (CTS) appeared in print (Pajet, 1854). Since 1960, CTS has become the most frequently diagnosed peripheral compression-induced neuropathy.

Historically, Putnam (1880) presented the first case series of patients with CTS symptoms with aetiopathogenetic hypothesis influenced by Raynaud's ideas (Putnam, 1880). And in 1911 Ramsey described this neuropathy, which in his opinion was secondary to compression of the motor branch of the median nerve (Hunt, 1914).

In 1913, autopsy findings by Marie and Foix grossly and histologically showed the compressed appearance of

the median nerve in the carpal tunnel, and James (1933) reported the first Transverse carpal ligament (TCL) release to treat median nerve compression at the wrist (Learmonth, 1933).

Phalen et al. (1950) wrote the first several articles on CTS, describing the clinical picture, diagnostic tests and epidemiology, and recommended the correct treatment ("surgical division of the ligament evidently decompresses the nerve sufficiently to return to its normal function. Since then, several clinical provocative tests were described with variable degrees of sensitivities and specificities; however none of them reached statistical significance to be termed diagnostic.

Much debate exists in the literature surrounding the diagnostic methods for CTS, but most CTS experts agree that the combination of nerve conduction studies (NCS) and subjective symptoms is currently the most accurate method of diagnosing CTS (Rempel et al., 1998; Stevens, 1997).

In the clinical setting, therapists and primary care physicians do not always have access to nerve conduction studies and rely heavily on subjective symptoms and common clinical provocative CTS tests. Common clinical provocative CTS tests include Phalen's test, Tinel's sign, and manual form of the Durkan/carpal compression test (mCCT).



**Figure 1.** Henna applied to a patient palms.

Hoffmann et al. (1993) described the sign in March 1915 on a method of evaluating the success of a nerve suture. Several months later, Jules (1915) published his work on the sign. Mixed results with sensitivities for the Hoffmann-Tinel sign ranges from 23 to 72% and specificities ranging from 55 to 94% (Gellman et al., 1986).

Gilliatt and Wilson (1953) published a description of the tourniquet test supporting diagnosis of CTS, with a sensitivity and specificity of 68 and 97% respectively (Gilliatt and Wilson, 1953).

John (1991) described the carpal compression test (CCT), in his original study; he reported a sensitivity of 87%, and a specificity of 90% (Durkan, 1991). Later on, mixing tests was associated with increased sensitivities and specificities; Phalen and tourniquet (sensitivity 92% and specificity 95%), Phalen and median-nerve compression test (sensitivity 82% and specificity 99%) (Tetro et al., 1998).

The first paper on the use of electromyography for the diagnosis of CTS appeared in 1956 (Simpson, 1956). Nerve conduction studies are reported by many authors to be the most accurate method for diagnosing CTS (De Krom et al., 1990). Whereas, other authors argue that nerve conduction studies are unnecessary for certain patient populations, and instead a thorough clinical history with a physical examination is adequate for diagnosing CTS (Szabo et al., 1999). Other authors advocate using a combination of nerve conduction study results and subjective symptoms to diagnose patients with CTS.

Numerous studies have examined the validity of Phalen's test, Tinel's sign, and mCCT, and the sensitivity and specificity of these tests vary considerably in the literature (Durkan, 1991; Szabo et al., 1999). This variability in sensitivity and specificity values for Phalen's

test, Tinel's sign, and mCCT leads one to question their utility. One possible reason for the variability in the literature is the fact that, most studies did not account for the severity level of CTS when assessing the validity of Phalen's test, Tinel's sign, and mCCT (De Krom et al., 1990; Durkan, 1991; Szabo et al., 1999; Gellman et al., 1986).

Because of this variability, NCS was done for all patients who have symptoms and signs of CTS and willing to go for surgery. Over the last few years we have observed patients in our clinics with Henna applied to their hands (Figure 1) in a trial to relieve their typical CTS symptoms as it has a traditional popular pain relieving characteristics.

Henna, a traditional product with religious associations, has been widely used in Asia (India) and the Middle East since ancient times as a hair, nail, and skin dye. Henna is a finely ground brown or green powder originating from dried leaves of the plant *L. inermis* which is grown in tropical zones, of North Africa (Sudan), India, and the Middle East (Jallad and Espada-Jallad, 2008).

The literature is lacking with concerns to the proved benefits of Henna, however, it is claimed to have the following effects (Makhija et al., 2011): Tuberculostatic, Antiviral Antioxidant, Antibacterial, Antifungal, Protein glycation inhib, Wound Healing, Antipyretic, Analgesic, Anti-inflammatory, Molluscicidal, Antitrypanosomal, Antidermatophytic, Antiparasitic, Antifertility, Immunomodulatory, Nootropic, Hepatoprotective, Antidiabetic, Anticancer.

Ali et al. (1995) and others studied the anti-inflammatory, antipyretic and analgesic effects of *L. inermis* (Henna) in rats, and their basic conclusion was that, crude ethanolic extract with subsequent extraction of butanol and chloroform showed potent anti-inflammatory, analgesic and antipyretic effects comparable to that of phenylbutazone. The analgesic effect of Henna was also described by Almeida et al. (2001) in his review article plants with central analgesic activity.

Henna has also been used as an antirheumatic and antineuralgic remedy in the traditional medicine of Lebanon (El Beyrouthy et al., 2008), and as a medicinal herb in the Northern Badia Region of Jordan (Alzweiria et al., 2011).

Henna use to relieve symptoms of CTS is not a common practice. Only 41 patients had Henna stained hands out of 6115 (0.67%) patients who attended our clinic with typical symptoms of CTS and had nerve conduction study to prove the diagnosis. However, the probability of having a positive NCS in Henna stained hands is higher than non stained hands.

## Conclusion

After reviewing the controversial value of the available provocative signs and tests in the diagnosis of CTS and

knowing that, none reaches statistical diagnostic superiority, The study concludes that, the clinical observational sign of Henna being applied to hands in symptomatic patients may be at least indicative for further investigating our patients, of course notwithstanding the fact that, the exact role of Henna in relieving such symptoms (if any) is still an area for further future research.

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