

## Carpal tunnel syndrome and its relation to dentist

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### ABSTRACT

**Introduction:** Carpal Tunnel Syndrome (CTS) is a compressive neuropathy, caused by mechanical distortion produced by a compressive force of the median nerve at the level of the wrist. Primary sign is pain in the wrist, tingling sensation, pain or numbness in thumb, index finger, middle finger, and radial side of the ring finger, also there is a reduction of the grip strength and function of the affected hand. This sign tend to be worse at night and clumsiness during the activities that requiring wrist flexion. This syndrome is well-known and frequent accounts for 90% of all entrapment neuropathies. Incidence rates up to 276:100.000 per year. More common in females than in males, its occurrence is commonly bilaterally with a peak age range of 40 to 60 years. This is the productive age, which is often reported that the Carpal Tunnel Syndrome are work-related musculoskeletal disorders caused by strain and repeated movements. **Discussion:** Dentist are high risks to go through musculoskeletal disorders covering wrist joint. The condition may happen because of the dentist position while handling patients is not in ergonomic position. These include repetitive prolonged hand activities, forceful static posture of wrist, vibration, and localized mechanical stress. To reduce the symptoms of musculoskeletal disorders since the beginning, has developed an integrated concept of teamwork in a modern dental practice. This concept is known as the four-handed dentistry which consists of dentists and assistants with their respective skills. **Conclusion:** The four-handed treatment techniques has been developed that is now largely acceptable. The concept of four-handed dentistry is expected to prevent the movement that makes the muscles tense, especially in the area around the wrist. And may ultimately reduce the incidence of Carpal Tunnel Syndrome.

**Keywords:** Carpal Tunnel Syndrome; ergonomic; dentist; four-handed dentistry.

## ABSTRAK

*Latar Belakang: Carpal Tunnel Syndrome (CTS) adalah neuropathy kompresif, yang disebabkan oleh gangguan mekanis akibat tekanan pada saraf medianus pada daerah pergelangan tangan. Gejala utama CTS adalah nyeri pada pergelangan tangan, kesemutan, nyeri atau rasa tebal di jari-jari tangan, kekuatan menggenggam dan fungsi tangan yang menurun. Gejala ini cenderung lebih berat pada malam hari dan pada saat beraktifitas yang memerlukan gerakan menekuk pergelangan tangan. Tujuan: Tujuan dari studi ini adalah untuk mencari hubungan antara angka kejadian CTS dengan posisi dari dokter gigi pada saat bekerja menangani pasien dan implementasi four handed dentistry untuk mencegah CTS. Pembahasan: Sindroma ini sering terjadi dengan angka kejadian 90% dari semua kejadian neuropati karena penekanan saraf. Angka kejadian mencapai 276 : 100.000 pertahun. Sering terjadi pada perempuan, dan sering terjadi pada kedua tangan dengan rentang umur 40 - 60 tahun. Dokter gigi merupakan pekerjaan dengan resiko tinggi untuk mengalami sindroma ini, karena posisi ketika menangani pasien dan penggunaan alat yang mempunyai getaran. Untuk mengurangi sindroma ini dikembangkan konsep terintegrasi yang disebut four handed dentistry, terdiri dari dokter gigi dan asisten. Simpulan: Konsep four handed dentistry diharapkan dapat mencegah pergerakan berlebihan di sekitar pergelangan tangan dan menurunkan angka kejadian carpal tunnel syndrome*

*Kata Kunci: Carpal Tunnel Syndrome; ergonomis; dokter gigi; four-handed dentistry.*

## INTRODUCTION

Carpal Tunnel Syndrome (CTS) is a peripheral mono-neuropathy of the upper limb, caused by compression of the median nerve as it passes through the carpal tunnel into the wrist. In the carpal tunnel the median nerve lies immediately beneath the Palmaris longus tendon and anterior to the flexor tendons. Conditions that decrease the tunnel's size, or swell the structures contained within it, compress the median nerve against the transverse ligament bounding the tunnel's roof. Such circumstances can arise by traumatically, congenitally, or due to systemic or inflammatory effects. Several cases that cause CTS include diabetes mellitus, rheumatoid arthritis, acromegaly, hypothyroidism, pregnancy and tenosynovitis.<sup>1</sup> This study focuses, however, on general description of CTS, putative occupational causes, its epidemiology, clinical features and investigation. Attention should be given to well-established and suspected risk factors in the workplace, and the compensation, prevention and optimum management of work-associated cases.

Musculoskeletal disorders is the most common medical problems among the workers

including dentist. This conditions affecting at least 7 percent of the population and 14 percent of all doctor visits. Work-related musculoskeletal disorders make up 34 percent of lost workday injuries. This case include repetitive-motion disorders and conditions such as carpal tunnel syndrome and hand-arm vibration syndrome. These are the injuries that result from repetitive work, awkward or constrained postures, heavy lifting, pinching grasps, forceful movements, and vibrating tools. Work-related musculoskeletal disorders are the nation's leading job-safety problem, causing more than 600,000 workers to lose work time each year and costing an estimated \$15 to \$20 billion in worker compensation costs and lost productivity.

Ergonomic intervention can be considered as one method to avoid this matter, reduce the risk and disorders and finally can increase productivity. Ergonomic can be used to achieve quality of life, if the workers can apply ergonomics principal into their work. The most important think is the workers can be empowered, so can identify the problem and its sources and could find the best solutions according to their need in the field of any activities.

## LITERATURE REVIEW

### Characteristic of CTS

Nerve conduction is related to its function in sensory and motoric into or from the central nervous system and peripheral nervous system. Nerve conduction disorders can be caused by anatomical position or functional position. Sensory symptoms are common in the absence of obvious pathology. More than 30% of adults in one British population survey reported sensory symptoms in the digits in the past 7 days).<sup>2</sup> 'Classical' symptoms, and improvement with surgery, occur despite normal nerve conduction; delayed nerve conduction occurs fairly often in asymptomatic individuals; and Tinel's and Phalen's signs can be found in the absence of other syndromes features.<sup>1</sup> Consistency of symptoms related to validity of tools that is used to assess the symptom.

### 2. Assessment CTS

In research, the situation is rather better.<sup>3</sup> The hand diagrams of Katz *et al.*<sup>4</sup> represent a standardized, widely used method of collecting patients' symptom histories. By pre-specifying and agreeing the shading patterns of 'classical', 'probable' and 'possible' distributions of CTS-like symptoms, different observers have reached acceptable agreement over case history.

In one workplace study two observers achieved a 96% agreement over the rating of 255 hand diagrams collected from workers at 12 worksites<sup>5</sup>; and in another, good agreement was found between three experienced clinicians assessing the hand diagrams of 333 employees.<sup>6</sup> Others, by pre-specifying a combination of symptoms and signs, have shown that research-trained observers can agree reasonably well.<sup>7</sup>

Reproducibility of case history is a useful achievement, although not synonymous with validity of diagnosis. Nor has disagreement in research been eliminated entirely; rather it is manifest in debate about interpretation of the hand diagram. Katz and Stirrat<sup>4</sup> have defined symptoms of CTS as "classical" if they affect at least two of digits 1-3 but not the palm or dorsum of the hand, as "probable" if the palm is also involved, and as

"possible" if symptoms are reported in only one of digits 1-3. Minor modifications to these criteria have been suggested by Franzblau *et al.*<sup>2</sup> and Rempel *et al.*<sup>2</sup>

The Katz hand diagram (and other features like Tinel's and Phalen's signs) have been assessed for their positive and negative likelihood ratios (LRs), assuming that nerve conduction is a sufficient, if imperfect reference standard.<sup>8,10,11</sup> LRs assess how much a positive diagnostic test raises (or a negative test lowers) the post-probability of disease, and so offer an appealing framework for judging a test's influence on clinical decision-making - the higher the +LR the better a test will be at ruling in a disease, the lower the -LR the better at ruling out a disease. However, by the criteria of Jaeschke *et al.*<sup>12</sup> the LRs do not suggest a 'significant' shift in the post-test likelihood.

### 3. Hazard and Risk

A review by Hagberg *et al* in 1992 identified 15 cross-sectional studies and six case-control studies with reasonably high quality information on occupational associations with CTS.<sup>13</sup> Most investigations analyzed risks by job title, finding high prevalence rates and relative risks (RR) in a number of jobs believed to involve repetitive and forceful gripping. A second systematic review in the 1990s, by the US National Institute of Occupational Safety and Health, concluded that there was 'evidence' of positive associations with work that entailed highly repetitive or forceful movements of the hands, and 'strong evidence' in relation to the combination of these exposures, but 'insufficient evidence' that the syndrome was caused by extreme wrist postures.<sup>14</sup> A textbook from the same period<sup>15</sup>, while not finding positive evidence on all of the so-called Bradford Hill criteria for causality, concluded that there was 'strong evidence supporting the contribution of work-related factors to the development of CTS'.

Updating these earlier reviews, Palmer *et al.*<sup>16</sup> identified 38 relevant reports. The occupations and industries studied ranged widely, but most fell into three broad classes - jobs entailing the use of vibratory tools, assembly work, and food processing and packing.

Table 1. Studies that report the risk of Carpal Tunnel Syndrome by occupational title (adapted from Palmer et al.<sup>(18)</sup>)

Author (date)	Exposed group	Reference group	Diagnostic criteria	Subgroup	RR (95% CI)
<b>Hand-transmitted vibration:</b>					
Bovenzi et al 1991	65 forestry workers	31 mixed blue collar workers	Symptoms + signs		21.3 (p = 0.002)
Bovenzi 1994	145 quarry drillers and 425 stone carvers	258 polishers and machine operators (not exposed)	Symptoms + signs		3.4 (1.4 - 8.3)
Chatterjee et al 1982	16 rock drillers	15 matched controls	Electro diagnosis		10.9 (1.0 - 5.2)
Fariškila et al 1988	79 chainsaw workers with >500 hrs of sawing per year	None	Symptoms + nerve conduction		Prevalence 26%
Kokkimies et al 1990	217 forestry workers using chain saws >500 hrs in past 3 years	None	Symptoms + nerve conduction		Prevalence 20%
<b>Assembly workers, food processors and retailers:</b>					
Abbas et al 2001	104 electrical (TV) assembly workers	94 clerical workers	Symptoms and nerve conduction		11.4(3.6-40.2)
Barnhart et al 1991	106 ski manufacturing workers in repetitive jobs	67 non-repetitive jobs	Electrophysiology + physical signs		4.0(1.0-15.8)
Bystrom et al 1995	60 female automobile assembly workers	90 female general population referents	Symptoms + signs		2.9(0.1-60.0)
Cannon et al 1981	Cases - 30 cases of CTS in aircraft engine workers	randomly selected workers from the same plant	Workman's claims + medical records of CTS		7.0(3.0-17.0)
Leclerc et al 1998	Workers from assembly lines (479), clothing and shoe industry (264), food industry (307), packaging (160)	337 controls	Signs or positive nerve conduction	Assembly Clothing Food Packaging	4.5 (2.3 - 9.1) 4.1 (2.0 - 8.7) 3.1 (1.4 - 7.2) 6.6 (3.0-14.2)
Leclerc et al 2001	Cohort study of 598 workers from 5 sectors - assembly, clothing manufacture, food and packaging, and cashiers; estimates for baseline prevalence and incidence over 3 years		Signs or positive nerve conduction		Prevalence/Incidence varied <2-fold between groups
Chiang et al 1990	121 frozen food packers	49 office staff and technicians	Symptoms, signs, and/or delayed nerve conduction		11.7(2.9-46.6)
Kim et al 2004	69 fish processors	28 managers and secretaries	Symptoms + nerve conduction		Prevalence 26% (exposed) vs. 0% (unexposed)
Schottland et al 1991	93 poultry workers	85 job applicants poultry jobs	Delayed nerve conduction		2.9(1.1-7.9)
Morgenstern et al 1991	1058 female grocery cashiers	None (internal comparison)	Self-reported symptoms	<26 hrs/wks 26 - 34 hrs./wks. >34 hrs/wks	1.0 1.5(1.0-2.4) 1.9(1.1-3.1)
Osorio et al 1994	56 supermarket workers - bakery ice's, meat cutters and cashiers working >20 hrs. per week	Low exposure group (others)	Symptoms + nerve conduction		8.3 (2.6 - 26.4) 6.7 (0.8 - 52.9)
<b>Textile workers:</b>					
McCormack et al 1990	Textile workers involved in boarding (296), knitting (352), packaging/folding (369) and sewing (562)	Non-office workers (468)	Symptoms + signs	Boarding Sewing Packaging Knitting	0.5 (0.05 - 2.9) 0.9 (0.3 - 2.9) 0.4 (0.04 - 2.4) 0.6 (0.1 - 3.1)
Punnett et al 1986	162 female garment workers (85% sewing and trimming by hand)	76 hospital workers	Median nerve symptoms		2.7(1.2-7.6)
<b>Other :</b>					
Liss et al 1995	1066 Canadian dental hygienists	157 dental assistants	Doctor-diagnosed CTS Median nerve symptoms		5.2 (0.9 - 32.0) 3.7 (1.1 - 11.9)
Rosecrance et al 2002	Apprentice trades union construction worker: sheet metal workers (136) engineers (486), plumbers/pipe fitters (330)	Apprentice electricians (163)	Symptoms and nerve conduction	Sheet metal workers Engineers Plumbers/pipe fitters	2.0 (0.8 - 5.0) 1.0 (0.5 - 2.2) 1.2 (0.5 - 2.0)



Nine reports, mostly related to occupation such as quarry/rock drillers<sup>18,19</sup>, stonemasons<sup>18</sup>, forestry workers<sup>17,20,21</sup>, but also including two case-control studies and one household survey<sup>28-30</sup>, confirm hand-transmitted vibration as a risk factor for CTS. Exposures to vibratory tools tended to be relatively prolonged and intense. In one study, cases had used rock drills for an average of 10 years<sup>19</sup>; in another, foresters had used chainsaws occupationally for >11 years<sup>17</sup>; and in two further studies of foresters, cumulative exposures exceeded 8 years of continuous tool use.<sup>20,21</sup> A case-control study of surgically-treated CTS found a more than doubling of risk from work with hand-held vibratory tools, but with exposure durations defined very broadly (between 1 and 20 years)<sup>30</sup>, and a second reported a RR of 3.3 for exposure to power tools or machinery for >6 hours/day.<sup>28</sup>

Increased risks were reported in ski assembly workers employed an average of five years in jobs involving 'repeated and/or sustained' flexion, extension, or ulnar or radial deviation of the wrist (Odds Ratio (OR) 4.0); in automobile assembly workers (OR 2.9)<sup>23</sup>; in electrical assembly workers (OR 11.4)<sup>22</sup>; and in workers assembling small electrical appliances, and motor vehicle and ski accessories (OR 4.5).<sup>22</sup> Excess risks were also reported in food processing and food packing - in poultry workers (OR 2.9)<sup>24</sup>; in food processors (two studies)<sup>25,29</sup>, and in frozen food packers (OR 11.7).<sup>24</sup>

Many of these occupations involve prolonged or repeated flexion and extension of the wrist, and in keeping, assessments of risk by main activity find higher risks with these exposures. Four studies<sup>27-30</sup> found that repeated flexion and extension of the wrist increased the risk of physician-confirmed CTS. Three studies pointed to wrist flexion or extension for at least half of the working day as carrying a notably high risk. In one study risks were elevated 5-8-fold when the self-reported time spent in activities with the wrist flexed or extended was  $\geq 20$  hours/week<sup>27</sup>, and in a second the OR for CTS was 2.1 to 2.7 for those estimating that they bent/twisted their wrists for >3.5 hours per day vs. 0 hours/day.<sup>28</sup> The most telling evidence on force and repetition comes, however, from a well-known and careful survey by Silverstein *et al.*<sup>31</sup> which videotaped workers from 7 different industries.

When repetitive work (hand-wrist flexion and extension) was defined by a cycle time of <30 seconds or >50% of cycle time involving the same activities, the OR was 2.7 in low force (hand force <1kg) jobs and 15.5 in high force (hand force >4 kg) jobs - highlighting an interaction between force and repetition. A study by Tanaka *et al.*<sup>29</sup> found that risks were increased nearly six-fold in workers bending/twisting the hand or wrist 'many times per hour'. Other studies, by Leclerc *et al.*<sup>122</sup> found associations with assembly tasks involving a short elemental cycle time (<10 seconds/repetition).

Use of the computer keyboard and mouse have also been closely studied, but with far less evidence of elevated risk. A painstaking cohort study of 5,000 Danish professional technicians found an association between incident, self-reported sensory symptoms in the median nerve distribution and use of a right-handed mouse, but no association with use of keyboards, and the overall incidence of symptoms was very low, causing the authors to conclude that "computer use does not pose a severe occupational hazard for developing symptoms of CTS".<sup>32</sup> Other surveys have also proved generally reassuring.<sup>28,34</sup>

The studies mentioned here are not without individual limitations. In particular, almost all collected information about exposures retrospectively, with potential for information bias. Some studies were small and some may not have fully controlled for confounding. Conceivably, a few investigations were prompted by workplace clusters, which would lead to unrepresentatively high estimates of risk. Notwithstanding these problems, the body of evidence as a whole is consistent, and the stronger studies, including those that undertook direct assessments of exposure rather than relying on self-report, point in the same direction.<sup>16</sup> Finally, from a biomechanical viewpoint, the findings are plausible. It can be demonstrated experimentally, in human cadavers and animal models, that extreme flexion and extreme extension of the wrist increase the pressure in the carpal tunnel sufficiently to impair blood perfusion of the median nerve.<sup>37,38</sup> so that epidemiological and physiological investigations offer a coherent view of causation.

Dentists are at high risk for musculoskeletal disorders due to the nature of their work. A survey published in the Journal of the California Dental

Association in February 2002<sup>1</sup> found that 61 percent of dentists surveyed said they had experienced work-related neck pain during the year; 51 percent reported lower-back problems; 44 percent said they had shoulder pain; 43 percent had upper-back pain; 38 percent reported hand pain; 30 percent mentioned mid-back pain; 14 percent indicated arm pain; and 10 percent reported leg pain.

Women suffer higher rates of work-related musculoskeletal disorders, in part because their jobs require the kinds of activities that cause these problems. Women make up only 46 percent of the workforce, yet they account for 62 percent of the work-related cases of tendonitis and 70 percent of carpal tunnel cases. According to OSHA, each year more than 100,000 women experience work-related back injuries that cause them to miss work.

A study published in the September 2002 issue of the *American Journal of Industrial Medicine* (4) found that a large percentage of dental hygienists reported work-related musculoskeletal disorders, especially in the wrist, neck, and upper back. In fact, more than 90 percent had experienced at least one musculoskeletal complaint in a 12-month period.

Dentists also are at risk for carpal tunnel syndrome. This condition occurs when repetitive motions and/or sustained postures damage tissues and cause swelling that puts pressure on the median nerve, which passes through a narrow channel in the wrist called the carpal tunnel. This causes painful tingling, numbness, and loss of grip strength. Women are more likely to develop carpal tunnel syndrome than men, partly because hormonal changes can cause fluid retention, which can be an aggravating factor.

In one study, published in the February 2001 *Journal of the American Dental Association*<sup>5</sup>, more than 1,000 dentists were tested at American Dental Association Annual Health Screening Programs in 1997 and 1998. The study's authors, from the School of Public Health at the University of Michigan, diagnosed median mono neuropathy (disease, inflammation, or damage to the median nerve) in 13 percent of the dentists using electro-diagnostic techniques. However, only 32 percent of those dentists reported symptoms of carpal tunnel syndrome. The authors concluded that although dentists had a higher rate of carpal tunnel syndrome symptoms than the general population,

when electro-diagnostic measures were used, the prevalence was determined to be nearly the same.

Dentists lose millions of dollars a year because they have to cancel patient appointments or can't work due to musculoskeletal pain. In 1987 alone, dentists had to cancel 1.3 million patient appointments and lost income amounting to \$41 million – more than \$65 million in today's dollars.<sup>2</sup>

#### *4. Prevention*

One thing that all experts (including OSHA) seem to agree on is that the key to preventing work-related musculoskeletal disorders is ergonomics – the science of fitting the work environment to the worker. Ergonomics is a critical issue for women because the traditional one-size-fits-all approach to workplace design has been based largely on an average for male workers. This means that women often must function in work environments that have not been adapted to their size and shape. It is exactly this kind of situation that can lead to musculoskeletal injuries, and that is why the ergonomics is needed. Most dental equipment, operatory layouts, and procedure techniques were developed with an average male dentist. As a result, female dentists have been forced to adapt their unfit shaped frames to a workplace environment designed for a man.

It is difficult to say just how large a problem work-related musculoskeletal disorders are for women dentists. Studies of dentists tend to involve primarily or exclusively male subjects. A study in Australia that did include women dentists found that 82 percent of all respondents reported experiencing one or more musculoskeletal symptoms during the previous month. Fewer women than men reported having no symptoms. Female dentists also were more likely to report frequent pain and headaches and to rate the severity of their most severe symptom higher than the male dentists did.<sup>3</sup>

There have been a number of studies done on dental hygienists, a population that is over whelming female. Although the tasks performed by hygienists are different, studies of this group may be a good indication both of the risks involved with the types of motions female dental professionals make and of the effects on women of using dental tools in a work environment designed primarily for men.

While the tendency might be to offer an uncomfortable chuckle at this point, the facts are not so funny. If the doctor isn't close enough to the oral cavity, she must lean forward, which results in awkward head posture. When the head is pushed forward, the weight of the head on the neck increases by about 300 percent. This can lead to chronic muscle problems in the upper back.

The authors stated that early recognition of carpal tunnel syndrome can lead to more effective management and that education regarding ergonomic risk factors can be an effective preventative. There is a need for additional study, particularly to determine the carpal tunnel risk for women dentists.

Dentists want to provide good patient care and run a productive, profitable practice, but it's difficult to do that when their hands go numb and their backs are seized with pain. The answer can't be simply to cut back on work, yet that's a path many dentists are being forced to take. Other dentists have had to reduce the number of hours they work. Some have even been forced into early retirement.

There are things manufacturers can do to help prevent musculoskeletal injuries and to enable dentists to practice without restricting themselves. Most dental equipment manufacturers are working to develop ergonomically designed products. Some are also changing their specifications to make equipment adaptable to people of smaller (or taller) stature. In some cases, though, the solution may require a whole new approach.

Has developed an integrated concept of team work in a modern dentistry. This concept is known as the four-handed dentistry which consists of dentists and assistants, each of which has a skill. In general, the design of dental units made with sputum-bowl which is located in the position of an assistant, so this part placement inhibiting assistant in the area. As a result, the dentist must take and return the hand piece or other equipment on / in place, so that the operator focus moved from the patient's mouth into the instrument tray. This causes physical stress on the body that often moves to the position of tensed muscles, such as the wrist. Good tool though not necessarily provide ergonomic benefits, a good tool to be used correctly.

The concept of four-handed dentistry is expected to prevent the movement of muscles

tense. This concept is not just the removal of the tool from the assistants to the dentist or to get the job faster and easier. Also need skills in implementing a reliable teamwork. Although it has been working with the concept of four-handed dentistry, when using tools that do not support the system ergonomics or placement tool out of reach of the assistant or dentist alone, it will persist muscle tension from excessive movement.

Some principles are recommended to apply the concept of four-handed dentistry in order to provide better benefits<sup>(49)</sup>, namely:

1. Dentists are expected to train an assistant so no need to conduct inefficient movement.
2. Assistant who helps the dentist must have knowledge and skills in handling the equipment.
3. Assistant should be more frequent handling equipment e.g. saliva ejectors, suction pump, hand piece and drill, so that the dentist does not have to do it yourself.
4. The layout of the equipment should be handled more assistants are on hand assistant for facilitate the removal tool to the dentist.
5. Assistants must also be located in areas that are free so you can easily move the appliance without passing through the patient's chest.
6. Operatory-field shaped in such a way that there is free space, good for assistants, dentists and patients.

## DISCUSSION

CTS is a reasonably common disorder in people of working age, although its diagnosis is not without elements of difficulty and controversy. The disorder can cause functional handicap and is compensable under some circumstances when occupationally related. Clear associations have been established between CTS and workplace activities involving exposure to hand-transmitted vibration and/or repeated and forceful movements of the hand/wrist; many occupations are at increased risk. Symptoms may be avoidable if good ergonomic practices are followed, and control of mechanical risk factors in the workplace can aid rehabilitation of the affected worker. In vibration-induced CTS, a change of occupation is often indicated.

The prevalence of symptoms consistent with CTS in the dominant hand among dentists



was higher than the prevalence in the general population. However, when electro-diagnostic confirmation is added, the prevalence of CTS was nearly the same as that among the general population.

Ergonomics intervention can be considered as one method to reduced hazard and risk of CTS thought several method and approach. Work condition should be improved through re-design process. Re-design can be applied into workstation, work posture, time scheduled, works process, layout and others. Short break every time and scheduled is better than one break after long time works. Ergonomics application can increase productivity through reduce of accident and work related diseases, reduce absenteeism, increase work time. All this condition can enhance quality of live.

## CONCLUSION

CTS is a reasonably common disorder in people of working age including dentist, although its diagnosis is not without elements of difficulty and controversy. The disorder can cause functional handicap and is compensable under some circumstances when occupationally related. Clear associations have been established between CTS and workplace activities involving exposure to hand-transmitted vibration and/or repeated and forceful movements of the hand/wrist. Ergonomic practices application can be used to avoid CTS by control workplace and workstation. Redesign on dental's the equipment can be applied based on dentist dimension even male or female.

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