

Carpal Tunnel Syndrome Among IT Professionals

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Abstract— The reliance on regular repetitive movements of the hand and the wrist has led to an increase in the Carpal Tunnel Syndrome (CTS) among various professions. Among these professions, it is prevalent among IT professionals. With the widespread use of computing devices and unavoidable uses of mobile phones, the occurrence of CTS is increasing among all age groups. Carpal tunnel syndrome is defined as the numbness, weakness and other problems in your hand due to the pressure on the median nerve in the wrist. The carpal tunnel is a narrow, rigid pass way of ligaments and bones at the base of the hand. The repetitive hand motions can contribute to CTS. The ergonomics of IT professionals often points out to higher chances of getting a CTS due to the repetitive flexion and extension of the wrist. The repetitive motions includes typing. This is especially significant when your hands are lower than your wrists. This project aims to provide an overview of this condition with an emphasis on the treatment methods involved in CTS and designing of a wrist brace.

Index Terms— Carpal Tunnel Syndrome, median nerve, diagnosis, wrist braces

1 INTRODUCTION

Carpal tunnel syndrome (CTS) is a common disorder that causes pain and numbness in the wrist due to the compression of the median nerve as it passes from the wrist to the hand. The various causes of CTS include an injury to the wrist such as sprain or fracture, an underactive thyroid gland, rheumatoid arthritis, pregnancy and occupational factors. Work related CTS occurs when the routine works require repetitive movements of the hand and the wrist. Thus CTS are seen among various professionals like carpenters, electronics assembly workers, typists, software and IT professionals who are performing repetitive hand movements. This can have a significant impact on the health and productivity of workers leading to a decrease in the quality of life. This rapid increase in CTS among various age groups has led to increased interest in the development of effective orthotic aids.

Ergonomics can play an important role in limiting CTS. Among IT professionals, maintenance of good posture is important for the prevention of CTS. Poor workstation ergonomics such as inappropriate location of monitor, keyboard or

mouse are associated with musculoskeletal problems such as CTS. Relaxation of wrists and hands at frequent intervals could help in the prevention of these musculoskeletal problems. Once CTS has developed and symptoms present, using wrist braces and interventions based on exercises can help to manage the pain. When pain becomes chronic, surgery is the dominant treatment. However the effectiveness of surgery depends on various factors such as how long is the patient suffering from CTS.

In this project, we developed a wrist brace that could help those who suffer from CTS. This is a cost effective wrist brace made of recycled water bottles. These wrist braces helps your nerves to heal after a long day of repetitive use.

2 TREATMENT METHODS

Treatment methods are basically of two types - Surgical and non-surgical. When the pain is mild and moderate non-surgical methods such as hand exercises and wrist braces are used. Wrist braces provide the support one need to help alleviate wrist pain. A good wrist brace will apply gentle

compression, without inhibiting wrist movement. Many people with carpal tunnel syndrome wear a wrist brace at night to relieve mild to moderate symptoms. The brace can hold the joint in a neutral position. Simple hand exercises are also recommended for people with CTS. These exercises can help in reducing the pressure on the median nerve and thus improving the blood circulation in the hands. These exercises are designed so as to mobilise the nerve.

Surgical methods are recommended when the pain is chronic. Generally, surgery involves severing a ligament around the wrist to reduce pressure on the median nerve. Either open surgery or endoscopic surgery is done to cut the carpal ligament and thereby expanding the carpal tunnel.

3 DEVELOPMENT OF A WRIST BRACE

Many people who suffer from CTS have mild and moderate symptoms like pain and numbness in the hand. Wearing a wrist brace and avoiding too much stress in the joint can help in providing relief. Wrist braces provide the support one needs to help alleviate wrist pain. A good wrist brace will apply gentle compression, without inhibiting wrist movement. Here we present a cost-effective and easy-to-make wrist brace using recycled water bottles. These are light weight, easy to use and comfortable than other wrist braces.

A bottle is cut at the top and its edges are smoothed. Similarly the bottom of the bottle is removed and made into the size. Small holes are punched at the bottom around the centre. Now, two large holes are cut. One for thumb and the other for other fingers. These holes are cut accordingly so that the fingers can pass through. Now the whole model is laced so that it is ready to use.



4 CONCLUSION

Carpal tunnel syndrome is a median nerve disorder that occurs due to repetitive hand movements. It is often a result of combination of factors that reduce the available space for the median nerve within the carpal tunnel. The risk of developing carpal tunnel syndrome is not confined to people in a single industry or job. This can occur in people who are involved in doing repeated hand motions. In IT professionals, improving ergonomic conditions can help prevent this disorder of the nerve. Computer keyboards with an elevated and curved surface are recommended. Here we saw the use of wrist braces. A wrist brace can be worn for support. A brace does not always offer relief from its symptoms, but it has no side effects compared to other treatment methods.

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