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Physical Therapy with Adjunct Therapies in Patients with Chronic Pain and Disability Post-Motor Vehicle Accidents

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Abstract

This project is a thorough literature review of studies concerning physical therapy interventions in conjunction with adjunct treatments for patients post-motor vehicle accidents focused on the therapy's efficacy as related to functional outcome measures. Physical therapy is frequently treatment of choice for patients after minor motor vehicle accidents. However, most patients seek concomitant therapies like acupuncture, chiropractic, epidural steroid injection, and psychological counselling. This paper seeks to gather data on the efficacy of different treatment modalities when used in conjunction with each other. Often patients are traumatised or develop anxiety about driving requiring counselling and therapy. The vast majority of patients subsequently develop chronic pain that is lifelong, and often debilitating with significant economic and psychosocial costs.

Introduction

Motor Vehicle Accidents are ranked by World Health Organisation as the second leading cause for death in young people with 1.2 million casualties worldwide every year. Additionally, an estimated 50 million people are injured in motor vehicle accidents annually. Long term care for these people who are injured in traffic accidents is often lacking and underfunded. Many symptoms in these patients show up only at a later stage and are not well researched. Current guidelines include treating physical and psychological symptoms to improve functional outcomes and quality of life. The standard practice includes physical therapy, however multidisciplinary treatment programs including counselling, therapy for PTSD, and alternative medicine are not well known. Research shows better outcomes for patients referred to adjunct care in addition to physical therapy as part of an interdisciplinary program than physical therapy alone. Patients may benefit from physical therapy in conjunction with psychological and chiropractic care in terms of functional outcomes and independence, quality of life, and satisfaction. The purpose of this paper is to review the literature for treatment modalities commonly prescribed for patients after a motor vehicle accident and their efficacy in various combinations.

Search strategy and selection criteria:

Searches were conducted in PubMed, EMBASE, PEDro, CINAHL, Cochrane using the following search terms – “motor vehicle accidents” and “road traffic accident” in combination with “physical therapy”, “rehabilitative therapy”, “acupuncture”, “counselling”, “massage therapy”, “behavioural therapy” using appropriate MESH terms.

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Inclusion criteria:

1. Randomized controlled trials, cohort studies, or systematic reviews
2. All subjects were patients who sustained motor vehicle accidents
3. Outcome measures were clearly defined
4. All clinical trials included treatment with physical therapy combined with one or more adjunct therapies

Exclusion Criteria

1. Case reports
2. Patients population not specified
3. Data not available in sufficient detail

Literature Review:

Traffic casualties have a high cost, both in terms of human life, and socioeconomic and cultural consequences. A study of one thousand acute trauma victims presenting to an emergency department of a hospital in Iran, the direct costs (prehospital, hospital, physiotherapy, rehabilitation, out-patient visits, surgical interventions) and indirect costs (loss of productivity) together were estimated to be 2.19% of the Gross Domestic Product annually. Of great concern was that the mean age of disability was found to be 43 years (Rahmati, 2019) since more years of productive life will be affected. This financial burden is likely to be significantly higher in countries with poor healthcare infrastructure, systemic inequalities in access to healthcare, and widespread car culture.

Indicators Pre-Motor Vehicle Accident

It has been found that at-fault drivers in light motor vehicle crashes were known to have mental health problems, including depression and suicidal ideation, that could possibly increase risk taking behaviour that consequently lead to accidents (Sassi, 2018). Another study in Brazil indicated similar findings towards a link between mental health and risk behaviours assumed by people involved in motorcycle accidents (Coêlho, 2019) and frequently increased by alcohol consumption (Santos, 2019). These at-risk behaviours are often worsened after the accident, compounded by trauma and chronic pain. Additionally, the use of anti-depressants has been known to affect motor coordination along with alertness, cognition, and memory (Khong, 2012). Conversely the use of ADHD medication showed strongly protective effect in reducing risks of motor vehicle accidents (Boland, 2020).

There is evidence to suggest that motor vehicle accidents are more common in lower income areas as evidenced by spatial analysis of traffic accidents. A study conducted in Pennsylvania found an association between the probability of being injured in a motor vehicle accident and the socioeconomic status of the person injured in the accident (Aguero-Valverde, 2006) showing that households with lower median income could be linked with higher probability of motor vehicle accidents. These findings were affirmed by a similar study in Switzerland that found poorer people are at higher risk of suffering motor vehicle accidents (Nyffeler, 2017).

Indicators in Post-Motor Vehicle Accidents

Researchers in Taiwan found that the majority of people involved in a motor vehicle accident (68%) reported only minor injuries, with only 22% requiring hospital stays. Yet an

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overwhelming 97.4% of the respondents experienced a loss of ability to work temporarily and 2.6% were permanently unable to return to work (Jou, 2014). A large study assessing 1500 people for trauma related symptoms after a motor vehicle accident found several key trauma-related features including intrusive recollections, situational avoidance, emotional reactivity, cognitive avoidance, and hyperarousal with exaggerated startle (Kazantzis, 2012). There is also research showing that women develop more severe PTSD symptoms than men across age groups, with middle-aged women worst affected, often associated with prior trauma exposure, lack of social support and differences in income (Kobayashi, 2018). A study looking at back pain from over 1.2 billion visits over a period of 2 years, found that about 70% of the patients visiting for back problems were in the 25-64 age group (Cypress, 1983).

It is estimated that up to 28% of the adult population in the USA, about 56 million people, live with chronic pain (Brennan, 2007) and millions more do so worldwide. From an analysis of the National Trauma Databank, a study assessing the prevalence of post-traumatic limb amputation found motor vehicle collisions to be the most common mechanism of injury, followed by machinery accidents (Barmparas et al, 2010). Not all amputees experience persistent pain however, and not everyone with acute pain develops chronic pain. Persistent Post-Traumatic Pain (PTP) and Persistent Post-Surgical Pain (PPP) are new terms that have evolved as a model for the transition from acute to chronic pain in individuals after trauma such as a motor vehicle accident and military trauma (McGreevey, 2011). While estimates of the prevalence of chronic pain vary, a study showed that about one third of amputees showed symptoms of depression, and more commonly in amputees with pain. Depression was also a key predictor of the severity of pain reported, as well as chronic pain in the subjects surveyed (Ephraim et al, 2005).

Treatment

These patients would most likely benefit from psychological therapy as an adjunct to physical therapy to recover. For patients with chronic pain and disability, both mental and physical, following a motor vehicle accident, a biopsychosocial approach may prove to be the most effective (Martinez, 2017). Specifically, Progressive Goal Attainment Programs and Cognitive Behavioural Physical Therapy are standardised programs with promising results with long lasting impact.

Another controlled cross-sectional study from Brazil found that patients often had low self-esteem and poor quality of life after a motor vehicle accident (Filho, 2016). A person-centred approach to physical therapy that humanised patients and prioritised their daily needs was found to be more effective than a disease-centred approach that focused on purely physical symptoms.

Pre-treatment motivation and readiness to self-manage pain and cognitive behavioural adaptation were found to be good predictors of treatment completion, functional outcomes, and return to work in patients after motor vehicle accidents (Tkachuk, 2012). Multidisciplinary functional rehabilitation programs were found to be most effective treatment for long term outcomes in patients who showed willingness to adopt active self-management techniques for symptoms.

A clinical trial in 109 adults found substantial rates of Major Depressive Disorder (MDD) and Post-Traumatic Stress Disorder (PTSD) in people injured in motor vehicle accidents in Sydney (Guest et al. 2018). In another preliminary randomised controlled study by the same group of researchers, Cognitive Behavioural Therapy (CBT) with telephone support significantly reduced psychological distress in people with depression after a motor vehicle accident (Guest et al. 2018) showing the need for positive intervention.

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A combination of chiropractic techniques and epidural steroid injections was found to be effective in pain management for patients following a motor vehicle accident (Qian, 2018). In the study conducted by Qian patients received procedures at either cervical, lumbar, or both regions and reported a clinically significant difference in pain and function. There is however a lack of meta analyses in this subject area due to studies with small sample size in the literature, indicating need for further study with larger subject numbers.

After a traumatic experience like a motor vehicle accident, coping mechanisms adopted by the patients can determine functional recovery in patients. A study reviewed pre and post treatment measures of physical performance and quality of life self-reported measures at a multidisciplinary functional restoration program found improvements when patients adopted active coping methods instead of passive approaches (Hall, 2011). In addition to coping mechanisms, social support was found to a successful and necessary resource for people after motor vehicle accidents, with appraisal support being more beneficial than tangible support and belonging support for this particular population (Gabert-Quillen, 2012).

Conclusion

From this review of the literature, it is apparent that a holistic interdisciplinary approach including different specialities like physical therapy, chiropractic, and psychology can be most effective in recovery after a motor vehicle accident. While patients show improvement with each intervention separately, positive changes are most significant when integrated to provide synergistic, holistic treatment. However, many of the intervention studies conducted are preliminary studies with small sample sizes and cannot be easily generalized for a larger population. Additionally, socioeconomic and cultural aspects play a significant role in recovery and rehabilitation and will have to be considered specifically for each patient population. As the incidence of motor vehicle accidents keep rising, there will be increased

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need for services to plan and manage care for victims of traffic accidents. Further research, perhaps from multi-institutional studies, will enable the formulation of an integrated multidisciplinary program for long term rehabilitation and disability management post motor vehicle accident.

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