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The Tampa scale of Kinesiophobia and pain, disability and grip strength in patients with lateral Epicondylalgia: A narrative review of the literature

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Abstract

Background: The Tampa Scale of Kinesiophobia (TSK) developed in 1990 is a 17-item scale originally developed to measure the fear of movement related to chronic lower back pain. It is believed to have application for other musculoskeletal pain conditions. When Lateral Epicondylalgia patients are treated, it would be easy and inexpensive tools to use to identify patients who are at higher risk of developing chronic symptoms and kinesiophobia.

Objective: To review the literature regarding TSK and pain, disability and grip strength in Lateral Epicondylalgia patients

Methods: A review was performed of all published studies which used the fear avoidance model and assessed TSK in individuals with Lateral Epicondylalgia. Various databases like Pub Med, Pedro, Cochrane and google scholar were searched initially on March 17, 2020. On April 19, 2020 these databases were searched for a second time to find new articles. Keywords used were Tampa scale of Kinesiophobia, Lateral Epicondylalgia. Only studies which assessed TSK in adult Lateral epicondylalgia population and were available in English were included. Studies which reported Lateral epicondylalgia combined with any other musculoskeletal conditions were excluded.

Results: Numerous studies were identified regarding Lateral Epicondylalgia and pain, function and grip strength. Very few studies were found regarding TSK in relation specific to Lateral Epicondylalgia. A total of 6 articles were reviewed according to inclusion criteria which included study from 2012 to 2017.

Conclusion: The fear avoidance model can be applied to Lateral epicondylalgia patients and there is value from a psychometric perspective in using the TSK to assess kinesiophobia.

Keywords: Tampa scale of kinesiophobia (TSK), lateral epicondylalgia, fear avoidance model

1. Introduction

Lateral epicondylalgia also known as Tennis elbow is defined as pain in or near the lateral humeral epicondyle or in the forearm extensor muscle mass as a result of abnormal strain according to medical subject headings. It affects between 1% and 3% of the general population, and up to 15% of workers who perform repetitive gripping tasks with high loads [1, 2, 3]. It is more common in subjects between 45 and 56 years, in the dominant arm, and without distinction of the sex [1, 4]. The average length of an episode is between 6 and 24 months [1, 5]. In the society Lateral epicondylalgia, a chronic pathology has a great impact [1, 6]. The International Association for the Study of Pain has defined chronic pain as "...that which persists further than the normal time of healing." The persistence of pain (or chronic pain) can cause changes in behaviour for both physical and psychological reasons [7, 11].

Miller, Kori and Todd in 1990 at the Ninth Annual Scientific Meeting of the American Pain Society introduced the word Kinesiophobia and describes a state where "a patient has an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or reinjury [7, 9, 11]. The Tampa Scale for Kinesiophobia (TSK) is a 17 item questionnaire used to assess the subjective rating of kinesiophobia or fear of movement the 17 item questionnaire Tampa scale of Kinesiophobia (TSK) is used [7, 9, 10, 11]. The original questionnaires was developed to "discriminate between non-excessive fear and phobia among patients with chronic musculoskeletal pain [8, 10, 11].

Several studies have found the scale to be a valid and reliable psychometric measure [7, 9, 10, 11]. Originally used to measure fear of movement related to chronic low back pain, the TSK has been used increasingly for pain related to different body parts [11]. The TSK is a self-completed questionnaire and the range of scores are from 17 to 68 where the higher scores indicate an increasing degree of kinesiophobia [12].

The fear-avoidance model (FAM) of musculoskeletal pain defines a probable process for the development of chronic pain syndromes [13, 14]. The FAM suggests that following musculoskeletal injury pain catastrophizing and fear of pain are primary psychological factors that determine recovery [13,14]. When pain catastrophizing and fear of pain are elevated, avoidance and escape behaviours are expected, increasing the likelihood of chronic pain [13,14]. Although the FAM has been widely studied in patients with low back pain, it is believed to have application for other musculoskeletal pain conditions [13,14].

Researchers have concluded that fear avoidance model may be predictive after Lateral epicondylalgia. The purpose of this narrative review of the literature was to summarize, and review the literature regarding the use of the Tampa Scale of Kinesiophobia and its relationship to elbow pain, disability and grip strength in patients with Lateral epicondylalgia.

2. Need of study

Tampa scale of Kinesiophobia was originally assessed for people with chronic Low back pain. Recently it has been used in other musculoskeletal conditions. Fear has normally been studied in the description, understanding and treatment of persistent musculoskeletal pain. Sources reported that upto 80% of the population will have musculoskeletal pain and a major cause of limitation of activity and disability. The most extreme form of fear of movement are referred as Kinesiophobia. The only way of operationalizing Kinesiophobia is by using the Tampa scale of Kinesiophobia [7, 8, 11].

It is necessary to explore both Physiological and Psychological factors as predictors of disability and Rehabilitation outcomes in order to provide effective rehabilitation for Lateral Epicondylalgia. Fear of movement

and reinjury is increasingly recognized for its role in prognosis and function of individuals with Lateral Epicondylalgia [15].

Numerous studies were identified regarding the Tampa scale of Kinesiophobia and Musculoskeletal pain. Far fewer were found regarding Tampa scale of Kinesiophobia in relation specifically to Lateral Epicondylalgia. Hence, purpose of this study was to summarize and review the literature regarding the use of TSK and its relationship to pain, disability and grip strength in Lateral Epicondylalgia patients. When Lateral Epicondylalgia patients are treated, it would be helpful to identify specific, easy and inexpensive tools to use to identify patients who are at higher risk of developing chronic symptoms and kinesiophobia [11].

3. Method

A review was performed of all published studies which used the fear avoidance model and assessed TSK in individuals with Lateral Epicondylalgia. Various databases like Pub Med, Pedro, Cochrane, Cumulative Index of Nursing and Allied Health Literature, Medline were searched initially on March 17, 2020. On April 19,2020 these databases were searched for a second time to find new articles. Keywords used were Tampa scale of Kinesiophobia, Lateral Epicondylalgia.

Inclusion criteria-Only studies which assessed TSK in adult Lateral epicondylalgia population and were available in English

Exclusion criteria-Studies which reported Lateral epicondylalgia combined with any other musculoskeletal conditions

4. Results

Numerous studies were identified regarding Lateral Epicondylalgia and pain, function and grip strength. Very few studies were found regarding TSK in relation specific to Lateral Epicondylalgia. A total of 6 articles were reviewed according to inclusion criteria which included study from 2012 to 2017.

Each of the six studies identified are discussed and summarized below:

Table 1: Summary of articles reviewed in the study

| Study reference number, Publication date and Authors | Sample size | Type of Study | Objective | Results and conclusion | Limitations |
|--|-------------|-------------------------------------|--|--|---|
| [16] 2017 Rasika <i>et al.</i> | 30 | Pre/post experimental study | Scaphoid Mobilization on Pain, Physical Function and Kinesiophobia | Positive results were found and supported the fear avoidance model | Other variables such as duration of symptoms, occupation, medication, stress and anxiety not considered |
| [1] 2017 Francisco Vicente Martínez-Cervera <i>et al.</i> | 24 | A pilot randomized controlled trial | To determine the influence of expectations plus mobilization with movement (MWM) in kinesiophobia, perceived disability and sensorimotor variables | Patients with reduced kinesiophobia, also perceived less disability at the elbow joint | Sample size was less |
| [19] 2018 Veena Kirthika <i>et al.</i> | 52 | Prevalence study | Prevalence of kinesiophobia in tennis elbow patients | The importance of Tampa scale in determining kinesiophobia and its reliability in individuals with Tennis elbow. The prevalence of kinesiophobia would have a harmful during the process of rehabilitation | Samples were form specific place and not necessarily targeted the population. |
| [17] | 30 | Experimental | To evaluate the effect of | Study showed positive results, in | Recruitment method may |

| | | | | | |
|------------------------------------|-----|-----------------------------|--|---|---|
| 2016 Ganesh. B.R <i>et al.</i> | | study | mobilization with movement on pain, kinesiophobia and activities of daily living | effects of Mobilization with movement on pain, kinesiophobia and activity of daily living | cause selection bias and/or symptom exaggeration |
| [18] 2016 Coombes | 24 | Randomized controlled trial | Assessed the acute effects of isometric exercise of different intensities on pain sensitivity in individuals with chronic lateral epicondylalgia | There was a significant correlation between pain, disability and kinesiophobia. | The study did not have any direct relationship of pain and disability with Kinesiophobia |
| [20] 2012 Coombes <i>et al.</i> | 164 | Cross-sectional study | To evaluate if sensory, motor and psychological factors are different in severe lateral epicondylalgia compared to less severe cases and control | The study did not detect any difference in fear of movement between different levels of severity of LE. | Varied inclusion criteria (patients with a minimum three month duration of LE were recruited from an orthopaedic upper limb clinic) may potentially account for study differences |

5. Discussion

There is scarcity of research regarding TSK in relation specific to Lateral Epicondylalgia. According to inclusion criteria which included study from 2012 to 2017 a total of 6 articles were reviewed. The first study in this section using the TSK on pain, function and Kinesiophobia was conducted by Rasika Panse, Chaitanya Sarwan, Ujjwal Yeole, Gauri Gharote, Shweta Kulkarni, Pournima Pawar and published on 2017. The study efficacy of Scaphoid Mobilization on Pain, Physical Function and Kinesiophobia in Patients with Lateral Epicondylitis was a pre post experimental study included 30 subjects and were assessed and evaluated with the Patient-Rated Tennis Elbow Evaluation Questionnaire and Tampa scale for Kinesiophobia prior to the intervention in patients with tennis elbow [16]. The aim of this project was to review the current evidence for the intermediating role of pain-related fear, and its immediate and long-term consequences in the initiation and maintenance of chronic pain and disability. Use of advice on fear avoidance beliefs with kinesiophobia and scaphoid mobilization showed an effect on patients' beliefs and clinical outcomes. Positive results were found in individuals with lateral epicondylitis, with the help of Tampa scale for kinesiophobia and patient rated tennis elbow evaluation. The study supported that Kinesiophobia is a commonly seen factor among the patients with musculoskeletal pain, which should be considered while planning interventions. Additionally, the study explored the effectiveness of fears, beliefs and kinesiophobia in patients with lateral epicondylitis at the time of a hospital visit. The moderate disability between pain and kinesiophobia suggest that there are findings which support the fear avoidance model in the patients with lateral epicondylitis during mobilization of scaphoid [16]. However, the study did not have a control group. When other variables were accounted such as duration of symptoms, occupation, medication, stress and anxiety the significance was lost. These variables previously have shown relationship with pain and function. In 2017 Francisco Vicente Martínez-Cervera¹, Theodor Emanuel Olteanu, Alfonso Gil-Martínez, Belén Díaz-Pulido, Raúl Ferrer-Peña used measures of elbow pain, grip strength, Tampa scale of Kinesiophobia (TSK), Patient Rated Tennis Elbow Questionnaire (PRTEE) and (DASH) Disability of shoulder and Hand to evaluate the Influence of expectations plus mobilization with movement in patient with lateral epicondylalgia. Using a randomized controlled pilot study, the authors evaluated 24 patients with lateral epicondylalgia. This was the only study in this review in which grip strength was assessed.

The aim of this study was to find the influence of expectations plus mobilization with movement (MWM) in kinesiophobia, perceived disability and sensorimotor variables in patients with lateral epicondylalgia [1]. Participants were randomly allocated to receive written directions in order to produce positive expectations regarding the technique in one group (n=12) or neutral expectations in the other one (n=12). All patients were treated for three sessions with the MWM technique. Measures were recorded before and after treatment. Regarding kinesiophobia, although the study did not find any differences between groups on Kinesiophobia, within positive expectation group clinically relevant differences were observed. The study did identify a large body of knowledge that relates fear with the development of avoidance behaviours as described in the fear-avoidance model proposed several years ago by Vlaeyen and Linton (2000). Based on this model it could be assumed that patients with more kinesiophobia could perceive more disability and vice-versa¹. Hence this study supports the model as in this study, those patients who reduced kinesiophobia, also perceived less disability at the elbow joint. However, the author said this outcome could be enhanced with the active movement component. No differences were found between and within groups in elbow PPDT, hand grip and pain intensity variables. Hence no relationship between these measures and Kinesiophobia could be identified from this study. The author considers that a bigger sample size could solve this situation in the significance direction for those variables. The author concluded that physical therapists should understand that placebo effect is an important mechanism in the treatment of lateral epicondylalgia patients, and in all those patients with musculoskeletal pathologies in general, since it can influence on perceived pain, disability or kinesiophobia¹. The major limitation of the study was the sample size although the aim of this paper was to perform a pilot study to calculate the necessary data size to perform a posterior study. The results showed no statistically significant differences in majority of the variables studied but the author believed this was due to the small sample analyzed and if we would increase the sample, the results could change. In 2018 Veena Kirthika published a study on prevalence of kinesiophobia among tennis elbow patients in India. The subjects in age group between 25-40 yr having tennis elbow were enrolled from Physiotherapy centres and hospitals in order to have uniformity in the study participants. Community dwelling population was included. Individuals

were individually examined using the Tampa scale of Kinesiophobia. Among 52 finalized samples, 17 subjects were housewives and their scores were high in the Tampa scale scoring [19]. This article gave a new dimension of research that housewives suffering from tennis elbow were at a greater risk of Kinesiophobia. The study concluded the importance of Tampa scale in determining kinesiophobia and its reliability in individuals with Tennis elbow. The prevalence of kinesiophobia would have a negative effect during the process of rehabilitation [19]. The limitation is primarily that by its nature, a prevalence study provides a small window into the research. It was unclear if the origin of kinesiophobia was due to previous bad experiences. Limitation of the study was the samples were from specific place and not necessarily targeted the population.

Ganesh. B.R, Gayatri Gurav, Josephine Gonsalves, Jemini Patel used Visual Analogue scale, Oxford Elbow scale and Tampa scale of Kinesiophobia to evaluate the effect of mobilization with movement on pain, kinesiophobia and activities of daily living in lateral epicondylitis Using an experimental study the authors evaluated 30 patients, both gender with lateral epicondylitis intervention measurements were taken using Visual Analogue scale, Oxford Elbow scale and Tampa scale of Kinesiophobia. Hence, the purpose of this study was to evaluate the effects of Mobilization with movement on pain, kinesiophobia and activities of daily living in patients with lateral epicondylitis Patients were given mobilization with movement and post measurements were taken. This study showed beneficial results, in effects of Mobilization with movement on pain, kinesiophobia and activity of daily living in Lateral Epicondylitis [17]. This was a first study of its kind to support that Kinesiophobia is one of the most extreme forms of fear related movement. Fear of movement is an important factor to result in disability, disuse and depression in subjects with Lateral Epicondylitis [17].

In 2016 Coombes *et al.* Assessed the acute effects of isometric exercise of different intensities on pain sensitivity in individuals with chronic lateral epicondylalgia. The number of individuals with unilateral lateral epicondylalgia of 3-month duration took part. Participants did three experimental tasks done in a randomized order on separate days: control (no exercise) and isometric wrist extension (10×15 s) at load 20% below (infrathreshold), and 20% above (suprathreshold) an individual's pain threshold. Pressure pain threshold, Self-reported pain intensity (11-point numeric rating scales) and pain-free grip were examined before, immediately, and 30 minutes after task performance. Relation analysis between pain ratings and clinical variables, including pain and disability and kinesiophobia was performed. Pain intensity during contraction was significantly higher during suprathreshold exercise than infrathreshold exercise. The author concluded there was a significant correlation between pain, disability and kinesiophobia [18]. Pain intensity was significantly higher immediately after performance of suprathreshold exercise, compared with infrathreshold exercise. However, the study did not have any direct relationship of pain and disability with Kinesiophobia in patients with Lateral Epicondylalgia [18].

The last study to be reviewed was published in 2012 by Coombes, Brooke K, Bisset, Leanne, Vicenzino, Bill. To assess if sensory, motor and psychological factors are unlike in severe lateral epicondylalgia compared to less severe

cases and control was the objective of this study. 62 healthy control participants and 164 participants with unilateral lateral epicondylalgia of comparable age and sex were given the following testing: quantitative sensory testing (pressure, thermal pain thresholds), pain-free grip, quality of life (EuroQol) and psychological (HADS, Tampa). Patients were classified into mild, moderate or severe subgroups by Cluster analysis using the Patient Rated Tennis Elbow Evaluation (PRTEE). The aim of this cross-sectional study was to find whether sensory, motor and psychological factors can differentiate the subgroup of LE patients with higher pain and disability from those with slighter symptoms and a healthy control population The degree of kinesiophobia, also known as fear of movement or injury, was assessed in the LE participants with the shortened Tampa Scale for Kinesiophobia (TSK-11). Each of the 11 items were scored on four-point Likert scales giving a total score ranging from 11 to 44, with higher scores indicating greater kinesiophobia. The authors did not detect any difference in fear of movement between different levels of severity of LE [20]. However, Varied inclusion criteria (patients with a minimum three-month duration of LE were recruited from an orthopaedic upper limb clinic) may potentially account for study differences [20]. The cross-sectional design would limit the casual relationship between various factors. Therapeutic and prognostic implications were not assessed. The potential bias cannot be discounted, as the examiner was not blind to the control group

6. Conclusion

The TSK was developed to determine the fear of movement in low back pain sufferers. In recent times the TSK has been used to measure kinesiophobia in different body parts. According to the inclusion criteria that were found during the research period for this review there have been only 6 studies conducted about Lateral Epicondylalgia and the TSK in general. Five studies supported that the fear avoidance model can be applied to Lateral epicondylalgia patients. To measure how kinesiophobia and Lateral Epicondylalgia are connected to perceived disability, the TSK has been used. Patients with Lower TSK scores had better elbow functions. However, these relationships did not always persist in all studies

There is scarcity of research on the relation between Kinesiophobia and Lateral Epicondylalgia. Further research is required to find out if, and to what extent, pain, function and grip strength correlate with Kinesiophobia in patients with Lateral Epicondylalgia. No studies focused on the treatment of Kinesiophobia. It was an adjunct with other primary measures to be assessed in order to provide effective rehabilitation protocol, avoid reinjury, it is imperative to assess Kinesiophobia along with pain, function and grip strength in patients with Lateral epicondylalgia.

7. Abbreviations: Tampa scale of Kinesiophobia (TSK), Patient Rated Tennis Elbow Evaluation (PRTEE), the fear-avoidance model (FAM)

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