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Carpal tunnel decompression: a comparison of elderly and younger patients' sleep quality

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The current study was conducted to evaluate sleep disturbances by age group in patients who underwent carpal tunnel decompression (CTD). Individuals who applied to the orthopedic outpatient clinic and had CTD between 2018 and 2022 had their medical records reviewed. Pre-operative data included patient demographics and the Pittsburgh Sleep Quality Index (PSQI). All post-surgery patients who returned for suture removal were clinically evaluated. Patients were requested to return for re-scoring on the PSQI 6 months after CTD. The cases' average age was 56.44±9.37 years. The study divided its subjects into two age ranges: those between the ages of 45 and 60 (82.2%) (Group1) and those between the ages of 70 and 85 (17.8%) (Group 2). The PSQI values of Group 1 were found to be significantly lower than Group 2. Preoperative PSQI levels were compared to post-op values at 2 weeks and 6 months, and both measurements decreased significantly. Sleep quality improved in all patient groups, regardless of their age, following CTD. Elderly patients had delayed improvements in sleep quality following CTD. The PSQI was effective in determining improvement following CTD, particularly in younger patients, and the progress remained for 6 months.

Keywords: sleep quality, carpal tunnel decompression, and elderly patients.

INTRODUCTION

The most common form of entrapment neuropathy, carpal tunnel syndrome (CTS), often presents itself at night[1]. The frequency is bimodally distributed, with peaks at 45 to 60 and 70 to 85 years of age[2]. Sleep disorders, including having trouble getting or staying asleep, are a growing number of people's health issues[3]. Obesity, hypertension, glucose intolerance, and cardiovascular problems are among the additional health issues that individuals with sleep disturbances are more likely to have[4-6]. Despite the fact that patients with musculoskeletal pain have been shown to experience sleep disturbances[7-8], clinical numbness and tingling symptoms associated with entrapment neuropathies can also cause sleep to be disturbed[9-11]. Sleep disruption is reportedly linked to a number of serious upper extremity problems in individuals[9-14]. Nonetheless, to the authors' knowledge, no study has evaluated sleep disturbances in patients undergoing CTD based on their age subgroups. We anticipate an increase in the likelihood of seeing elderly patients in our routine clinical experience due to general population aging patterns. Hence, this study was conducted to evaluate sleep disturbances by age group in patients who underwent CTD.

MATERIALS AND METHODS

A retrospective observational study was carried out by examining clinical data and conducting clinical consultations. The clinical records of those who applied to the orthopaedic outpatient department and received CTD surgery between 2018 and 2022 were reviewed. The study was approved by the local institutional ethical review board of the Fırat University Medical Faculty Ethics Committee (2022/13-19). All patients provided the written informed consent form in compliance with the hospital's ethical committee's norms. After conservative therapy such as wrist braces and steroid injections failed, surgical decompression was proposed. All CTDs were performed using a mini-open technique, and all were outpatient procedures done with just local anaesthesia. Patients were encouraged to exercise as soon as possible, and sutures were removed after two weeks. All patients had clinical assessments when they returned for suture removal in the second week following surgery. Due to the bimodal incidence of

carpal tunnel syndrome, patients were evaluated in two age groups: the elderly (70 to 85) and the comparatively younger (45 to 60). Pre-operative data included patient demographics and the Pittsburgh Sleep Quality Index (PSQI). Patients were requested to return for re-scoring on the PSQI six months after CTD. Exclusion criteria included being outside the age ranges of 45-60 and 70-85, having a previous record of CTD procedures to the operative hand, CTS developing intensely after trauma or surgery to the location, possessing diabetes mellitus, sleep apnea syndrome or restless leg syndrome, and autoimmune diseases, getting pregabalin or gabapentin for neuropathic pain, and taking medication for narcolepsy.

The PSQI is just a measurement that can assess sleep quality[15]. It comprises 19 questions to which the patient responds, which are classified into seven subtitles: quality of sleep, sleep latency, length of sleep, habitual sleep efficiency, sleep disorder, usage of sleep medication, and daytime functional problem. Each section is ranked from 0 to 3, with 0 signifying no disturbance and 3 representing the poorest quality of sleep. The sum of these seven sub-categories yields the overall PSQI score, with a higher score signifying poorer sleep quality. A total value of more than 5 signifies a lack of sleep. Five additional questions involve the patient's partner's or flatmate's evaluation and do not affect the overall result.

For statistical analysis of the study's findings, the IBM SPSS Statistics 22 (IBM SPSS, Turkey) application was employed. The Shapiro Wilks test was employed to determine the parameters' conformance to the normal distribution when analyzing the research data. In addition to descriptive statistical methods, the Mann Whitney U test was employed to compare parameters that did not exhibit a normal distribution in the comparison of quantitative data. For in-group comparisons of non-normally distributed parameters, the Friedman test was utilized, and the Wilcoxon sign test was employed to determine the period generating the difference. To compare qualitative data, the Yates correction was utilized. The significance was determined at the $p<0.05$ level.

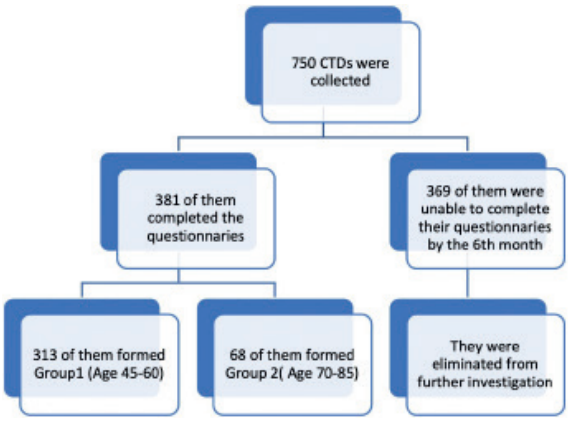

Figure 1 — Flowchart of our study.

RESULTS

Throughout the analysis, preoperative data for 750 CTDs was collected. However, 369 of them (49.2%) were unable to complete their questionnaires by the 6th month and were thus eliminated from further investigation (Figure 1). The present study included 381 participants, 51 (13.4%) males and 330 (86.6%) females, ranging in age from 45 to 85 years (Table I). The average age of the subjects was 56.44±9.37 years. There were two age ranges investigated in the current study: those 45-60 (Group 1) and those 70-85 (Group 2).

The current study discovered that Group 1 had substantially lower preoperative, postoperative 2nd week, and postoperative 6th month PSQI than Group 2 ($p<0.05$) (Table II). Analyses within each group revealed a statistically significant reduction in PSQI scores from pre- to post-op levels at week 2 and month 6 ($p<0.05$). Furthermore, the PSQI values in the 6th month following surgery were significantly lower than those recorded in the 2nd week after surgery ($p<0.05$). Before surgery, patients had an average global PSQI score of 11.44, which decreased to 9.66 two weeks following surgery and 9.29 six months afterwards (Table 2).

Table I. — Comparison of gender over age categories.

		Age Group		Total	p
		45-60 Age	70-85 Age		
		n (%)	n (%)	n (%)	
Gender	Male	38 (%12,1)	13 (%19,1)	51 (%13,4)	0,182
	Female	275 (%87,9)	55 (%80,9)	330 (%86,6)	
Continuity (Yates) Correction.					

Table II. — Comparison of preoperative, postoperative 2nd week, and postoperative 6th month PSQI levels across and among age groups

PSQI	Age Group		*Total*	p[1]
	45-60 years	70-85 years		
	(Min-Max)-(Mean±SD (median))	(Min-Max)-(Mean±SD (median))	*(Min-Max)-(Mean±SD (median))*	
Preop	(5-17)-(11,05±2,32(11))	(6-20)-(13,21±2,93 (14))	*(5-20)-(11,44±2,57 (11))*	**0,000***
Postop 2nd week	(3-17)-(9,42±2,72 (10))	(4-20)-(10,81±3,7 (10,5))	*(3-20)-(9,66±2,96 (10))*	**0,002***
Postop 6th month	(3-17)-(9,06±2,53 (10))	(4-20)-(10,37±3,48 (10))	*(3-20)-(9,29±2,77 (10))*	**0,003***
p[2]	**0,000***	**0,000***		
Preop-Postop 2nd week *p[3]*	*0,000**	*0,000**		
Preop-Postop 6th week *p[3]*	*0,000**	*0,000**		
Postop 2nd week-Postop 6th month *p[3]*	*0,000**	*0,003**		

[1]Mann Whitney U Test. [2]Friedman Test. [3]Wilcoxon Sign Test. *p<0.05. PSQI: The Pittsburgh Sleep Quality Index.

DISCUSSION

A noteworthy aspect of this study is the comparison of sleep disturbance following CTD in a typical elderly population to their younger peers. The current study examined patient sleep disturbances before and after CTD and revealed that sleep disturbances improved considerably in both groups after CTD.

There are studies on the market that indicate how crucial high-quality sleep is to human survival. Individuals with sleep disruptions are at increased risk for a number of other health concerns, including obesity, hypertension, glucose intolerance, and cardiovascular disease[4-6]. In another study, individuals with a poor sleep quality index also had a substantially higher likelihood of being depressed and a high body mass index[15].

The link between the clinical state of upper-limb dysfunction and sleep issues has been studied in the past[9-14]. Patel et al.[9] discovered that the more severe the CTS, the longer it took to fall asleep and the less time patients slept in total. Buysse et al.[16] reviewed a matched cohort of healthy individuals and reported a median PSQI score of 2.67 (±1.70) rather than 11.44 (±2.57) in our cohort. Eighty percent of the individuals in our sample showed relevant sleep issues (total PSQI values greater than 5). Okkesim et al.[17] reported a preoperative global PSQI of 14 for their patients, which is in line with the results of the current study. The preoperative sleep examination of virtually all patients yielded high scores, allowing for a clinical diagnosis of insomnia, as reported in a prospective study by Tulipan et al. in 2017[14]. Patients were queried regarding the presence of concomitant sleep pathology at the time of enrollment; however, sleep polysomnography screening was not conducted prior to data collection. Participants in the current research may have had sleep issues that have yet to be diagnosed. These results highlight that elderly patients had less recovery in sleep quality versus younger ones, and the PSQI score is a more reliable indicator in younger individuals for postoperative follow-up.

Patients with severe pre-operative nerve conduction deficiencies had a poorer prognosis, as just 47% of Bland's[18] patients reported being satisfied with their outcomes. In his investigation, Bland[18] continued by stating that the worst prognosis occurred in elderly individuals with severe conduction deficiencies. Nonetheless, he did not check his patients' quality of sleep. Stone et al.[19] reported that super-elderly patients had the same clinical outcomes and satisfaction scores as the younger control group. However, he made no mention of sleep quality. In the current study, the elderly patients' PSQI scores were higher compared to the younger ones but nerve conduction measurements were not performed. Thus, we intend to highlight that studies examining the association between nerve conduction metrics and sleep quality in elderly individuals are required.

Multiple restrictions concern the current study. Firstly, while patients were questioned about concurrent sleep pathology upon admission, sleep polysomnography screening was not conducted prior to data collection. Secondly, grip strength and other notable indications of CTS severity were not regularly gathered in this study. Thirdly, numerical electrophysiologic data were not performed to check into the link between illness severity, nerve damage, and sleep quality. Lastly, its retrospective nature and recall bias while gathering patient questionnaire responses. The study's strength

lies in its examination of age-specific differences in sleep quality following CTD. The assessment of sleep quality in the early and late postoperative period following CTD, based on the patient's age, are also important aspects.

CONCLUSION

Consequently, sleep quality improved in all patient groups, regardless of their age, following CTD. Furthermore, we discovered that elderly patients had delayed improvements in sleep quality following CTD. Further results revealed that the PSQI was a valuable tool for evaluating improvement following CTD, particularly in younger individuals, and that the progress persisted for up to 6 months thereafter.

Conflict of interests: We declare that all authors are free of financial or any other conflicts of interest in this article.

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Ethics approval: The study was approved by the local institutional ethical review board of the Fırat University Medical Faculty Ethics Committee (2022/13-19).

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