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## Outcomes following the conservative management of patients with non-radicular peripheral neuropathic pain



Joseph M. Day MSPT, PhD, OCS, CIMT<sup>a,\*</sup>, Jason Willoughby MHS, OTR/L, CHT<sup>b</sup>,  
Donald Greg Pitts MS, OTR/L, CHT<sup>b</sup>, Michelle McCallum MS, DPT, OCS<sup>b</sup>, Ryan Foister OTR/L, CHT<sup>b</sup>,  
Tim L. Uhl PT, ATC, PhD, FNATA<sup>c</sup>

<sup>a</sup> Pat Capps Covey College of Allied Health Professions, Department of Physical Therapy, University of South Alabama, HAHN 2011, 5721 USA Drive N, Mobile, AL 36688-0002, USA

<sup>b</sup> Kentucky Hand & Physical Therapy, Lexington, KY, USA

<sup>c</sup> Department of Rehabilitation Sciences, University of Kentucky, Lexington, KY, USA

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### ABSTRACT

*Study design:* Prospective cohort.

*Introduction:* There is limited evidence for conservative management of patients with non-radicular peripheral neuropathic pain (PNP).

*Purpose:* To investigate the effectiveness of a comprehensive treatment approach on pain and disability in patients with non-radicular PNP and to determine if improvements are maintained following the discontinuation of therapy.

*Methods:* Patients received a multi-modal therapeutic intervention. Outcome measures were the shortened version of the Disabilities of the Arm, Shoulder and Hand questionnaire (QDASH), Numeric Pain Rating Scale (NPRS), and grip strength. Follow-up data were collected 5 ± 2 months post-discharge.

*Results:* There was a significant improvement in the QDASH and mean pain ( $p < .001$ ). There was no significant change in grip strength ( $p > .13$ ). Follow-up data suggest that pain and disability scores are maintained ( $p < .001$ ).

*Conclusion:* A comprehensive, conservative treatment program has a positive and lasting effect on pain and disability scores in patients with non-radicular PNP.

*Level of evidence:* IIIa

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### Introduction

Non-radicular peripheral neuropathic pain (PNP) can be described as nociceptive symptoms that are a result of a lesion or disease affecting the somatosensory nervous system distal to the cervical nerve roots.<sup>1</sup> Non-radicular PNP can be caused from a variety of systemic conditions, trauma, or nerve entrapments.<sup>2</sup> The symptoms associated with nerve entrapments, burning, numbness, pain, and tingling, are specific nociceptive symptoms that originate from repetitive motion, microtrauma, and poor posture.<sup>3–6</sup> Neurogenic thoracic outlet syndrome (TOS), carpal tunnel syndrome (CTS), or cubital tunnel syndrome (CuTS) are examples of nerve entrapments commonly treated in physical rehabilitation settings. However, it is sometimes difficult for clinicians to give a definitive diagnosis for patients with nerve entrapment symptoms

due to the poor diagnostic accuracy of some of the available physical tests<sup>7</sup> and the clinical observation that nerve entrapment syndromes often involve multiple nerves. Therefore, investigators have used the term non-radicular PNP as a more inclusive way to describe patients with nerve entrapment symptoms.<sup>1,8</sup>

Conservative treatment strategies for patients with non-radicular PNP often include a multi-modal program that focuses on the specific region of the pathologic tissue. For CuTS, treatment techniques such as neural gliding, splinting, rest, ultrasound, activity modification, and ergonomic education at the cubital are recommended.<sup>9–12</sup> In a recent systematic review on the conservative management of patients with CTS, the authors concluded that strong to moderate evidence was found for interventions that focus on the specific region of the carpal tunnel. Interventions such as ultrasound, nocturnal splinting, and ergonomic keyboards were found to be effective only in the short term, up to 6 months post treatment.<sup>13</sup>

Despite the literature's focus on interventions solely at the site of the symptoms, evidence suggests that the proximal region of the

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\* Corresponding author. Tel.: +1 251 445 9330; fax: +1 251 445 9238.

E-mail address: josephday@southalabama.edu (J.M. Day).

upper quarter may be an important component of the rehabilitation of patients with non-radicular PNP. In a review of conservative thoracic outlet syndrome (TOS) management, the authors concluded that proximal posture corrections and peri-scapular strengthening were effective at reducing pain, improving function, and facilitating return to work.<sup>6</sup> In further support of postural interventions, distal neural mobility has been shown to decrease when the scapula is placed in a protracted position.<sup>14</sup> As it relates to patients with distal non-radicular PNP, it has been observed that patients with mild to moderate CTS exhibit an increase in forward head posture<sup>15</sup> and disturbances in the thoracic outlet<sup>16</sup> compared to controls. Therefore, it has been proposed conceptually and demonstrated with a case study that proximal impairments should be addressed in the treatment of patients with non-radicular PNP as a part of a multi-modal therapeutic intervention.<sup>17–20</sup>

A therapeutic program that focuses on both the proximal and distal impairments has never been empirically investigated in a cohort of patients with non-radicular PNP. A comprehensive treatment program, intervention that addresses both proximal and distal impairments, has the potential to improve outcomes in patients with non-radicular PNP. Therefore, the purpose of this study is to investigate the effectiveness of a comprehensive treatment approach in patients with non-radicular PNP. The investigators'

primary hypothesis is that this cohort of patients will demonstrate a significant improvement in measures of pain, disability, and grip strength after therapeutic intervention. Secondly, improvements in pain and disability will be maintained following the discontinuation of therapy.

**Methods**

*Selection of subjects*

Consecutive patients presenting to 1 of 4 outpatient clinics between January 2011 and May 2012 with non-surgical neurological complaints in their upper extremity were considered for participation in this prospective single cohort study. Of the 36 enrolled patients, 2 dropped out and 2 were excluded from the study (Fig. 1). Demographic data of the 32 included patients are presented in Table 1. Mean age was 44 ± 11 years (range 21–71 years). Mean duration of symptoms was 5 ± 6 months (range 2 weeks to 2 years). Patients with bilateral involvement (15/32) represented 47% of our patients.

Inclusion criteria were: patient primary complaint of unilateral or bilateral neurological symptoms in the arm, elbow, wrist, or hand; between the ages of 18 and 75; presented with any positive

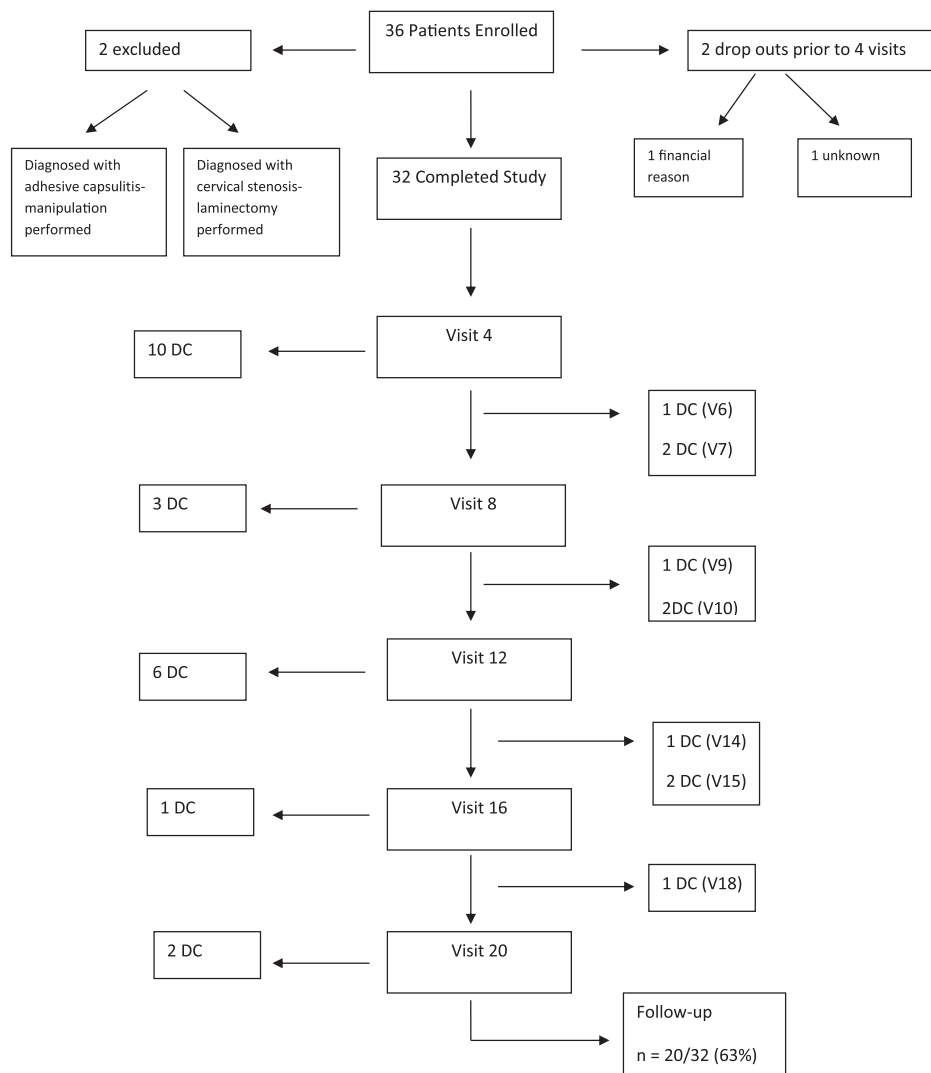


Fig. 1. Flowchart of subjects.

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