

# Effect of Mulligan Concept Lumbar SNAG on Chronic Nonspecific Low Back Pain

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## ABSTRACT

**Objective:** The purpose of this study was to investigate the outcomes of adding lumbar sustained natural apophyseal glide (SNAG) to a conventional therapy program for chronic nonspecific low back pain (LBP).

**Methods:** Forty-two participants with chronic nonspecific LBP were randomly divided into 2 groups. The study group (aged  $27.1 \pm 8.3$ , 20 men, 3 women) received a conventional physical therapy program consisted of stretching and strengthening exercises plus SNAG (based on the Mulligan concept) on the affected lumbar levels, and the control group (aged  $28.9 \pm 7.7$ , 13 men, 6 women) received the same conventional program without SNAG 3 times per week for 1 month. Outcome measures were repositioning error (the primary outcome), pain, and function measured by an isokinetic dynamometer, visual analog scale, and the Oswestry Disability Index. Measurements were recorded before and after the end of the treatment period.

**Results:** The comparison between pretreatment and posttreatment test scores indicated that both study and control groups had significant improvement in all dependent variables ( $P > .001$ ). However, adding SNAG to the conventional program resulted in higher improvement in terms of repositioning error, pain, and function ( $P = .02, .002, .008$ ) respectively.

**Conclusions:** This preliminary study indicated improvement in both groups. Adding SNAG to conventional programs in the treatment of chronic nonspecific LBP may result in greater improvement of repositioning error, pain reduction, and improved function. (J Chiropr Med 2017;xx:0-9)

**Key Indexing Terms:** *Low Back Pain; Proprioception; Postural Balance*

## INTRODUCTION

Low back pain (LBP) is a major health problem because of its high prevalence worldwide.<sup>1</sup> It affects almost every adult person at least once throughout his or her life span.<sup>2</sup> Low back pain is considered a multidimensional medical problem having multiple risk and causative factors.<sup>3-5</sup> The most common type of LBP is the nonspecific type, which is lacking definite pathologic cause. This nonspecific type represents about 85% of the LBP population.<sup>6</sup>

Pain in the low back has gained considerable attention within the medical community because of its major

socioeconomic impact. It is a major cause for seeking medical help, deterioration of functional ability, limitations in occupational activities, and work absence.<sup>2</sup>

There is no evidence suggesting the superiority of a specific treatment of LBP over others.<sup>7</sup> Moreover, most of the available treatments used in clinical practice have little or short-term effect.<sup>6</sup> Manual therapy is a common therapeutic approach used in the treatment of back problems. A recent systematic review reported medium to high evidence regarding the efficacy of manual therapies in the treatment of chronic LBP.<sup>8</sup> Different manual therapies, such as passive Maitland mobilization and Mulligan mobilization with movement, are used routinely in physical therapy practice.<sup>9</sup>

There is a gap in research concerning the efficacy of different manual techniques and their different physiological effects.<sup>10</sup> This is true regarding lumbar sustained natural apophyseal glide (SNAG), which is commonly used in the treatment of LBP.<sup>11</sup> SNAG is one of the Mulligan concept techniques performed from a weight-bearing position, with the mobilizing force applied over the affected spinous process while the patient is enacting the painful or limited movement. SNAG, when indicated, can provide immediate pain relief and improvement in range of motion (ROM) as it corrects the positional fault in facet joint.<sup>9</sup>

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Paper submitted September 1, 2016; accepted January 20, 2017. 1556-3707

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<http://dx.doi.org/10.1016/j.jcm.2017.01.003>

The majority of the research concerned with SNAG techniques has concentrated on the study of peripheral joints<sup>12-14</sup> and the cervical region.<sup>15-20</sup> Few studies have been concerned with the effects of SNAG on the lumbar spine.<sup>10,21,22</sup> The rest of the available research was in the form of case reports or case series.<sup>23,24</sup>

Only 5 trials have investigated different effects of the SNAG technique when applied to the lumbar region, none of them concerned with its effects on proprioception. Range of motion was investigated in 4 out of the 5 studies. It was improved in 3 of them<sup>10,25,26</sup>; no change was reported in the fourth trial by Moutzouri et al.<sup>21</sup> The increase in ROM was reported only in the studies performed on LBP patients, and no improvement was reported when applied on healthy participants.

Pain was investigated in 3 studies.<sup>10,25,26</sup> It improved in 2 of them,<sup>25,26</sup> although in the third study, Konstantinou et al failed to report any significant change.<sup>10</sup> Pain was measured with a visual analog scale (VAS) in all studies and in the present study. The controversy in the available literature regarding effects of lumbar SNAG on pain measure necessitates further investigation, as we did in the present study.

Functional disability level was recorded in 2 studies using 2 different tools.<sup>25,26</sup> The Oswestry Disability Index (ODI) was used by Hidalgo et al,<sup>25</sup> whereas the back performance scale was used by Heggannavar et al.<sup>26</sup> On both occasions patients reported better improvement in the level of function in response to SNAG.

New explanations for the effects of the lumbar SNAG were investigated in one study. Moutzouri et al have investigated the changes in the sympathetic activity of the lower limbs in healthy participants after the application of SNAG on the lumbar spine. Their results did not indicate any significant effect.<sup>22</sup>

Sensorimotor control, spinal segmental function, dynamic joint stability, and good motor control all are integral parts of back function. They largely are affected by proprioceptive deficits. Improper proprioceptive inputs may play a role in the development of LBP.<sup>27-31</sup> A systematic review conducted recently reported a reduction in proprioception along with decrease in ROM and slowed movement in patients with LBP compared with normal counterparts.<sup>32</sup> The results of this study support the link between LBP and proprioception deficits.

Repositioning error (RE) was found to be limited around 30° of trunk flexion in patients with LBP, as reported by Hidalgo et al<sup>33</sup> and Georgy.<sup>28</sup> The importance of studying proprioceptive response to different manual therapies seems to be of great importance; however, Gong was the first to study the change in RE in response to manual therapies (Gong mobilization).<sup>34</sup> No research has studied the effect of SNAG technique on the lumbar RE.

Studying the effects of SNAG on different body systems provides more understanding of its underlying mechanism and helps practitioners to properly use it in clinical practice.

Only a few studies have focused on neurophysiological effects of SNAG technique<sup>12,22</sup>; the majority have investigated its mechanical effect.<sup>21,26,35,36</sup> Some of the available reports cannot be used for generalization because of the limitations encountered in the study design.<sup>23,37</sup>

Therefore, the purpose of this study was to investigate the effect of adding Mulligan concept lumbar SNAG to a conventional LBP program on RE, pain, and function compared with a conventional LBP program alone in patients with chronic nonspecific LBP. We hypothesized that adding SNAG to the conventional LBP treatment would give more favorable results regarding the studied outcome measures.

## METHODS

### Design

A randomized controlled trial was implemented to investigate the effect of adding Mulligan concept lumbar SNAG to conventional treatment of chronic nonspecific LBP on 3 dependent variables: RE of the lumbar spine, pain, and function. Data collection was performed on 2 occasions, before and after the end of the treatment program. The study was conducted between November 2015 and January 2016.

### Participants

Forty-nine patients with back pain were recruited from the faculty of physical therapy outpatient clinic, Cairo University (Cairo, Egypt). They were referred for physical therapy by their orthopedist or orthopedic surgeon. After screening, 42 participants aged 17 to 50 years met the inclusion criteria and joined the study (details mentioned in Fig 1). Inclusion criteria were 3 months of continuous or intermittent LBP symptoms, ability to perform at least 40° of trunk flexion. Participants were excluded if they were pregnant, obese, had specific LBP, or had any contraindication to physiotherapy and manual therapy.

After signing a consent form, demographic data were collected and then the participants were randomly assigned into 2 groups. Randomization was simply performed by giving every participant an identification number. Using the SPSS program (IBM, Armonk, NY), these numbers were randomized into 2 groups.<sup>16</sup> The control group consisted of 19 participants (28.9 ± 7.7 years) who received the conventional program of stretching and strengthening exercises. The study group consisted of 23 participants (27.1 ± 8.3 years) who received the conventional program plus Mulligan concept lumbar SNAG. There was no dropout because all patients were able to complete the study. Ethical approval was obtained from the Cairo University Ethical Committee (approval no. P.T.REC/012/00861), and registered with the Australian and New Zealand clinical trials registry (ACTRN 12615001298505).

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