

### Summary and Perspective of Recent Literature

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**Heidar Abady A, Rosedale R, Chesworth B, Rotondi M, Overend T. (2017). Application of the McKenzie system of Mechanical Diagnosis and Therapy (MDT) in patients with shoulder pain; a prospective longitudinal study. *J Man Manip Ther*; DOI:10.1080/10669817.2017.1313929**

The aim of this study was to investigate if the response to MDT treatment with regard to pain and function for patients with shoulder pain varied by classification over time. An additional aim was to document the discharge rate by classification over time.

The MDT literature on shoulder conditions consists of Shoulder Derangement case reports (Aina and May, 2005; Kidd, 2013) and a case series (Aytona, 2013), a Contractile Dysfunction case report (Littlewood and May, 2007), and case reports of Cervical Derangements presenting as local shoulder pain (Menon and May, 2013; Pheasant, 2016). One survey of MDT Diplomats showed very good reliability in classifying shoulder patients according to the MDT system (Heidar A, et al., 2014). There have not been any previous large cohort studies evaluating the use of MDT in the shoulder. A previous survey of MDT clinicians (May and Rosedale, 2012) found that Derangement (42.5%), Contractile Dysfunction (11.7%) and Articular Dysfunction (10.8%) were common classifications in the shoulder.

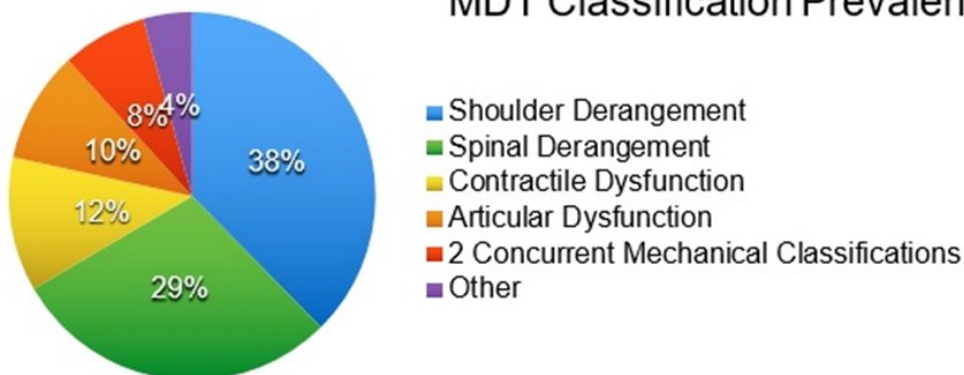
A prospective longitudinal design was used to collect data on consecutive shoulder patients. 15 international physiotherapists with either Credential or Diploma level training were recruited with at least one year of experience using MDT for upper extremity problems. Patients were required to be over 18, speak English and were ineligible if they had a shoulder surgery in the previous six months. No other inclusion/exclusion criteria were applied. Patients were assessed using MDT and were treated “as-usual” depending on the determined classification.

Primary outcome measures were Upper Extremity Functional Index (UEFI) scores (0-80/80 with greater scores indicating better function) and Numeric Pain Rating Scale (NPRS) scores (0-10/10). Data collection points were at the initial assessment, two weeks later and four weeks later. The secondary outcome was the frequency of discharge for each classification at two and four weeks. The main groups compared in data analysis were Spinal (Cervical Derangement), Derangement (Shoulder Derangement) and Dysfunction (articular and contractile); the latter group combined both Dysfunctions together to balance out sample sizes between the groups and were considered by the authors to behave similarly.

### Results

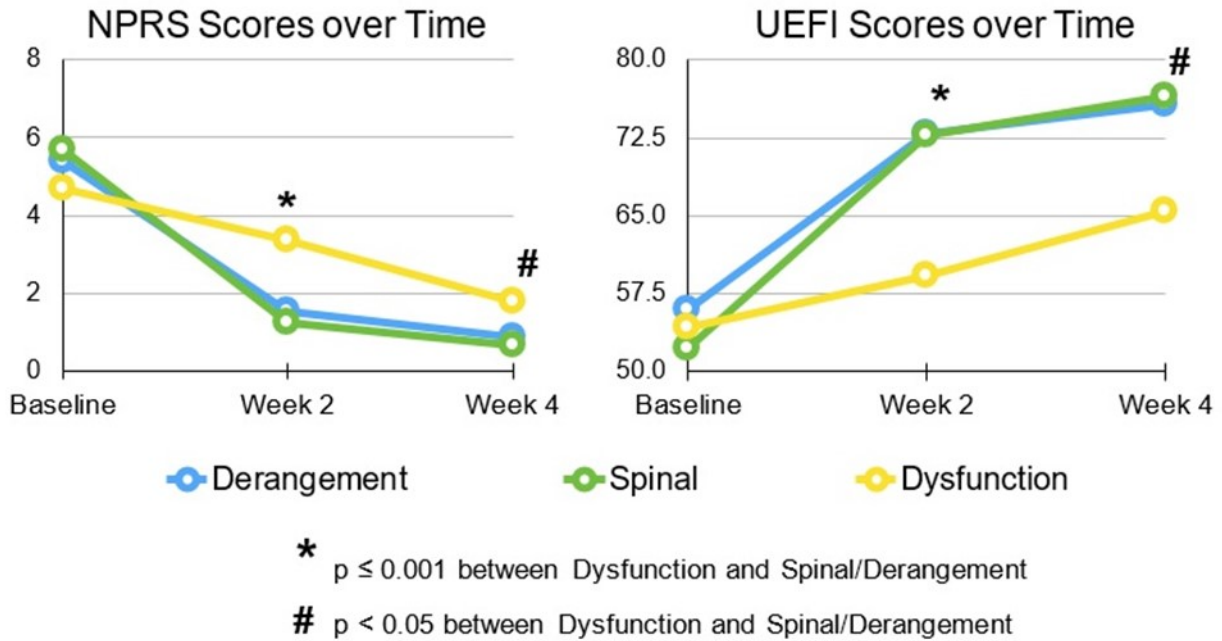
105 patients were recruited for the study, with 12 drop-outs. A breakdown of the final classifications of the 93 remaining patients is given below:

#### MDT Classification Prevalence



11 of these patients were excluded from final data analysis: seven had two concurrent MDT classifications (i.e.. Shoulder Derangement with residual Articular Dysfunction) and four were classified under OTHER. The group sizes were 35 for Derangement, 27 for Spinal and 20 for Dysfunction.

There were no significant differences between the three groups at the initial assessment for age, sex, hand dominance, previous episodes, medication use, symptom duration, activity levels, NPRS scores or UEFI scores. Statistically significant differences were seen between the Dysfunction and Derangement groups and between Dysfunction and Spinal for NPRS and UEFI scores at two and four weeks. No significant differences were seen at any time points between the Shoulder Derangement and Spinal Derangement groups.



The Derangement and Spinal Derangement groups showed similar frequency of discharge at weeks two and four, while discharge frequency was significantly less in the Dysfunction group at both time points:

Frequency of Discharge by Classification and Time		
Classification	Week 2	Week 4
Derangement	37%	83%
Spinal	37%	82%
Dysfunction	0%	15%

### Commentary

This work is an important contribution to the growing body of MDT literature on the extremity, as it is the first study to provide evidence that classifying and matching treatment to shoulder patients using MDT is a valid approach. Because there were minimal exclusion criteria and 15 international physiotherapists were recruited using a treatment-as-usual approach, the results are generalizable to MDT clinicians seeing shoulder patients. As anticipated, based on clinical practice, a majority of patients were rapid responders; two-thirds of this cohort had either a Cervical or Shoulder Derangement. Remarkably, despite different anatomical origins, they responded in a virtually identical way, lending further weight to Derangement as a valid clinical entity. Additionally, though expected based on clinical experience, the slower response of Dysfunction patients was nicely captured in this study.

Several limitations were noted by the authors. The number of treatment sessions was not fixed which may have affected results, but because the recruited therapists were unaware of the study intentions it is likely they strove for the best possible outcome with each patient. No exercise compliance was tracked with implications for the slower responses in the Dysfunction group, although anecdotal evidence indicates that this response rate is typical for this group. There was no control group or randomization and only MDT trained clinicians were used; however, given the aim of the study, this design was justified.

Interestingly, a high proportion (29%) of Cervical Derangements was found, compared to 2% reported in the May and Rosedale study (2012). In a recent smaller study, Maccio et al. (2017) found two out of 19 wrist patients had a Cervical Derangement (10.5%). Together this suggests that Spinal Derangements masquerading as extremity problems are increasingly being recognized and the importance of a thorough spinal examination in all extremity patients cannot be understated. This may partially account for the low prevalence of OTHER (4.3%) compared to the 35% seen for shoulder patients in May and Rosedale (2012). Thus, 95.7% of the cohort could be classified into one or more of the mechanical syndromes, suggesting that the clear majority of the shoulder population can be managed with simple mechanical interventions.

The results of this study along with the expanding extremity literature should give MDT practitioners even greater confidence to use the system for extremity classification. Well-designed studies such as this are continuing to endorse the system as a comprehensive assessment and management paradigm and support what is seen clinically on a daily basis.

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Maccio J, Carlton L, Fink S, Ninan C, Van Vranken C, Biese G, McGowan C, Maccio J, Tranquillo J. (2017). Directional preference of the wrist: a preliminary investigation. *Journal of Manual and Manipulative Therapy*; (published online ahead of print 9 February). Available at: <http://www.tandfonline.com/doi/full/10.1080/10669817.2017.1283767>. (Accessed July 5, 2017).

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## Summary and Perspective of Recent Literature

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**Maccio JR, et al. (2017). Directional preference of the wrist: a preliminary investigation. *Journal of Manual & Manipulative Therapy*; Doi: 10.1080/10669817.2017.1283767.**

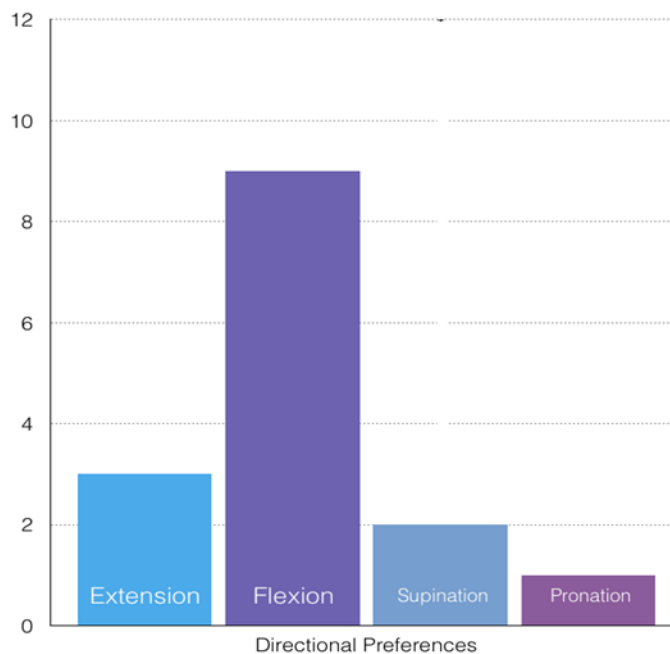
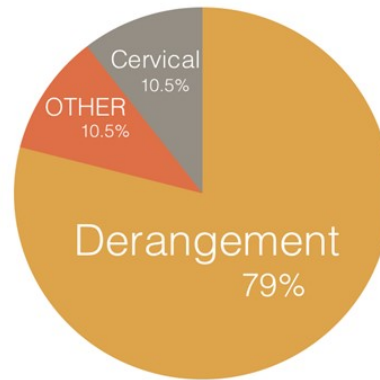
The objective of this investigation was to apply Mechanical Diagnosis and Therapy (MDT) to patients with wrist disorders and to determine the appropriate classification: Derangement, Dysfunction, Postural or OTHER. This study was in a case report style and took place in a private certified McKenzie spine and extremity out-patient clinic. The primary author has a doctorate in physical therapy and a Diploma in MDT. In addition, four students who were trained by the lead author, were co-examiners and their treatment was overseen by the lead author.

Nineteen patients with ages ranging from 15 to 69 years old were evaluated following MDT principles. Fifteen of these were classified as having a Wrist Derangements, two as Cervical Derangement and two as OTHER.

The patients classified with Wrist Derangement were evaluated to determine directional preference and were placed into one of four categories for the purposes of the study. The first, 'mechanical stress' indicates a repeated or sustained movement that is used most often throughout the day. 'Directional vulnerability' was a term used to describe the movement that reproduces the patient's symptoms. Painful Movement is the most painful movement as indicated by the patient's pain rating via the Numerical Pain Rating Scale. Finally, 'obstructed movement' was defined as the direction that is most limited compared with the opposite wrist.

Directional Preference was found for 15 of the patients and so they were classified with Wrist Derangements. Five of these patients required a change in direction following re-evaluation to promote continued resolution.

Classifications of wrist patients



Four of these patients also required traction with the Directional Preference exercise and two needed some specifically focused overpressure.

These patients were seen for a total of three to six visits to ensure proper management of symptoms prior to discharge. The other 10 patients were all able to manage their symptoms with the initial motion in their directional preference and they were all discharged at their second follow-up visit.

Investigators found 73.3% (11/15) of the patients demonstrated Directional Preference in the direction opposite of their 'mechanical stress', where 66% (10/15) had Directional Preference opposite of 'directional vulnerability'. Fifty three percent of the patients found Directional Preference associated with their most 'painful movement' (8/15). Finally, 46% of the patients found Directional Preference in the direction of the 'obstructed movement' (7/15).

This study found a high number of patients classified with a Wrist Derangement, however unlike previous studies, they found that patients required movement in multiple directions with various loading strategies to achieve directional preference (79%). These included loaded wrist extension or flexion, unloaded wrist flexion, wrist flexion with manual traction, wrist supination with proximal anterior and distal posterior overpressure and unloaded supination with high velocity whip. Previous studies focused on wrist extension and ulnar deviation as the only two motions to achieve directional preference.

In conclusion, patients included in this case series had a high success rate with MDT intervention. Wrist Derangement Syndrome was common and many of the patients were only seen for two visits with successful long-term management at home. MDT has been studied extensively in the spine, however this study adds to the growing knowledge base in the extremities. The study has also uniquely given some insight into the relationship between certain variables and directional preference. This encourages clinicians to use information gathered from a detailed history in order to guide the examination process and to formulate hypothesis as to cause and effect.

This study supports previous extremity studies indicating that MDT clinicians can use the MDT classifications of Derangement, Dysfunction and Postural Syndrome and OTHER subgroups and effectively apply them to the wrist. It is also important to note that two of the original 19 patients who were evaluated for wrist pain were categorized as having a Cervical Derangement. This also supports the recommendation to screen the cervical spine thoroughly for all upper extremity presentations, even down to the wrist.