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Efficacy of Myofascial Release

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This evidence project, submitted by

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has been approved and accepted
in partial fulfillment of the requirements for the degree of
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Keywords: Myofascial Release, Upper Extremity, Orthopedic Conditions

Abstract

In collaboration with Tomi Johnson and Domonique Herrin, hand therapists working in a MultiCare rehabilitation clinic, we sought to answer the question: In adults with upper extremity and cervical spine orthopedic and peripheral nerve conditions, does myofascial release (MFR) lead to functional outcomes (such as decreased pain or disability, or increased range of motion etc.), compared to therapeutic exercises, other manual therapeutic techniques, and/or modalities? Twenty-three research articles, systematic reviews and meta-analyses were included in our evaluation of the research. Based on our findings, moderate evidence exists to support the use of MFR in the upper extremity and its effectiveness in decreasing pain and disability, and increasing passive range of motion (PROM), strength, posture, quality of life (QoL), and overall function. We recommend that further research be conducted on the effectiveness of myofascial release within the scope of occupational therapy to determine the effects of myofascial release related to the upper extremity.

An informational binder that contained our critically appraised topic (CAT) table with summaries and copies of each article in the CAT was created as a future resource for our collaborating practitioners. Additionally, an inservice presentation was created to share the research findings with physical therapists and physicians who work alongside our collaborators. A pre/post inservice survey was created to monitor the effectiveness of these resources. Attendees reported a 62% increase in knowledge regarding current research investigating the efficacy of myofascial release following the presentation. It is recommended that future critical appraisals on this topic include studies examining the lower extremity due to the perceived generalizability of the fascial system from one region of the body to another, or studies involving self-myofascial release (e.g. patient-administered, foam rolling, etc.) that have become increasingly popular methods of implementation within the literature.

Executive Summary

We met with our collaborators, Tomi Johnson and Domonique Herrin, in September 2017 to discuss their research needs. They initially requested information regarding research investigating the efficacy of myofascial release in the treatment of upper extremity orthopedic and peripheral nerve conditions. Based on this request, our original research question was developed: In adults with upper extremity orthopedic conditions, does myofascial release lead to decreased pain and edema and increased functional performance, compared to therapeutic exercises including no manual techniques? After completing our literature search, this question evolved into our final research question based on the available evidence: In adults with upper extremity and cervical spine orthopedic and peripheral nerve conditions, does myofascial release lead to functional outcomes (such as decreased pain or disability, or increased range of motion etc.), compared to therapeutic exercises, other manual therapy techniques, and/or modalities?

After analyzing twenty-three articles, the following themes were identified: MFR without treatment comparison, MFR treatment alone compared to other treatment, MFR combined therapies compared to other combined therapies, and MFR examined in systematic reviews. In five articles (Ajimsha et al., 2012; Castro-Martin et al., 2017; Doraisamy et al., 2010; Namvar et al., 2016; Nisture & Welling, 2014) examining MFR without treatment comparison, statistically significant functional improvements were found in all five studies. In six studies (Gandhi et al, 2016; Kain et al., 2011; Piecelli et al., 2011; Rodriguez-Huguet et al., 2017; Sata et al., 2012; Singh & Chauhan, 2014) comparing MFR alone to another type of therapy, statistically significant outcomes following MFR treatment were found in all studies. Additionally, the MFR groups had statistically significant better outcomes in five of the six studies compared to other treatments (Piecelli et al., 2011; Rodriguez-Huguet et al., 2017; Sata et al., 2012; Singh & Chauhan, 2014). When MFR combined therapy was compared to other combined therapies in six studies (Chaudhary et al., 2003; Hou et al., 2002; Khuman et al., 2013; Kumar & Jetly, 2016; Rodriguez-Fuentes et al., 2016; Trivedi et al., 2014), statistically significant improvements in functional outcomes were found in all six articles using MFR techniques, but there is limited evidence

supporting that MFR combined with other treatment is more effective than exercises alone and inconclusive when compared to other manual therapy and modality combinations. In addition, five systematic reviews and one meta-analysis showed that the majority of articles found MFR to have positive and superior results compared to other techniques and treatments. Only one article reported adverse effects of mild, transient soreness after initial MFR treatment.

Based on the number of articles and level of rigor, there is currently moderate evidence to suggest that MFR may lead to positive outcomes in the treatment of orthopedic and peripheral nerve conditions. Further high quality Level I research is needed to determine the efficacy of MFR when used to treat upper extremity orthopedic and peripheral nerve conditions. After completing our research, we created an informational binder that contained our critically appraised topic (CAT) table with summaries. Copies of each article in the CAT were created as a future resource for our collaborating practitioners. In addition, we provided an inservice presentation to share our findings with physical therapists and physicians who work alongside our collaborators at the MultiCare rehabilitation clinic. A pre/post inservice survey was created to monitor the effectiveness of these resources. Attendees reported a 62% average increase in knowledge regarding current research investigating the efficacy of myofascial release following the presentation. In addition, when asked how much more likely therapists were to use myofascial release in their practice, the mean response on the post-inservice survey was a 7.8 (more likely) on a scale of 1-10.

CRITICALLY APPRAISED TOPIC PAPER

Focused Question:

In adults with upper extremity and cervical spine orthopedic and peripheral nerve conditions, does myofascial release lead to functional outcomes (such as decreased pain or disability, or increased range of motion etc.), compared to therapeutic exercises, other manual therapy techniques, and/or modalities?

Collaborating Occupational Therapy Practitioner:

Tomi Johnson, OTR/L, CHT and Domonique Herrin, OTR/L, LMT

Prepared By:

Michelle Chait, Erin Eaton, Tiffany Farley

Chair:

Sheryl Zylstra, DOT, OTR/L

Course Mentor:

George Tomlin, PhD, OTR/L, FAOTA

Date Review Completed:

11/14/17

Clinical Scenario:

Our collaborating practitioners, Tomi Johnson and Domonique Herrin, are hand therapists working in a MultiCare rehabilitation clinic. Domonique Herrin is a recent graduate with less than one year of experience, and Tomi Johnson is a Certified Hand Therapist (CHT) with more than five years of experience; both previously worked as massage therapists. Their manager oversees three other clinics, and he reports to the clinic director. The MultiCare rehabilitation clinic system is currently being merged with another system, thus their upper management organization is experiencing changes. The primary patient population at the clinic is adults with orthopedic and nerve injuries of the upper extremity. Clients are typically seen for 45 minutes twice a week for eight weeks. Payer sources include Medicare, Medicaid, and private insurance. Due to the nature of the MultiCare system, the results of this research project will not impact the current policies in place throughout the organization, but will impact the collaborator's ability to justify their services to referring physicians. The collaborating practitioners requested evidence supporting the use of myofascial release in the treatment of upper extremity orthopedic and peripheral nerve conditions. Research evidence would allow them to use better scientific, pragmatic, narrative, and conditional reasoning to guide their interventions. If strong evidence is found regarding its efficacy, it will also provide validation not only to the physicians who are referring patients to them, but also for justifying services billed in therapy.

Review Process

Procedures for the selection and appraisal of articles

Inclusion Criteria:

- Articles published on or after 1980 at first, changed to 2000 - see "Quality Control/Review Process" (p. 3)
- Articles published in or translated into English
- Adult participants (18 years and older) with orthopedic or peripheral nerve conditions of the upper extremity
- Interventions involving therapist-administered myofascial release
- Intervention occurring in any practice setting

Exclusion Criteria:

- Participants under the age of 18
- Participants with central neurological disorders
- Interventions involving self-myofascial release or instrument-assisted myofascial release
- Articles not published in peer reviewed journals

Search Strategy

Categories	Key Search Terms
Patient/Client Population	Older adult, young adult, grown-up, developed, mature, elderly, fully grown, musculoskeletal conditions, musculoskeletal injuries, orthopedic impairments, orthopedic trauma, orthopedic pain, musculoskeletal disorders, peripheral nerve injury, lateral epicondylitis, carpal tunnel syndrome
Intervention (Assessment)	Myofascial release (MFR), myofascial soft tissue mobilization
Comparison	Therapeutic exercises, sham therapy, no therapy, conventional treatment, modalities
Outcomes	Decreased pain, decreased disability, increased ROM, increased function, increased quality of life

Databases and Sites Searched
PubMed/Medline, PEDro, CINAHL, SPORTDiscus, Cochrane Library, OTSeeker, Google Scholar, OT Search
American Journal of Occupational Therapy, *British Journal of Occupational Therapy*, *Canadian Journal of Occupational Therapy*, *Australian Journal of Occupational Therapy*, *Journal of Hand Therapy*, *Physical Therapy Journal*

Quality Control/Review Process:

Three reviewers independently searched the above databases and sites. Date of publication was used as a filter for efficiency purposes and to prevent duplications. Assigned date ranges include: 1980-1999, 2000-2008, and 2009-2016. Articles published in 2017 were searched for collectively as a group due to a delay of indexing in certain databases. Each reviewer searched for articles using the aforementioned keywords and identified articles as relevant based on whether the keywords were identified in the abstract; *orthopedic* must be accompanied by *myofascial release* or an identified synonym to be considered relevant. Each reviewer then created a reference list of selected articles and these lists were reviewed as a group. Full text articles were collected after the group determined that an article met the inclusion criteria.

After identified articles were reviewed, search criteria were further refined to exclude the following: articles published in 1980-1999, articles that examined the lower extremity, and interventions involving self-myofascial release or instrument assisted myofascial release. The earlier years were excluded in order to include only the most relevant research regarding MFR application and outcomes. MFR application to the lower extremity was also excluded in order to maintain the focus towards an outpatient hand therapy clinic that primarily treats conditions of the upper extremity. Additionally, all described self-MFR and instrument-assisted MFR were excluded to emphasize the use of skilled manual therapy that is directly administered by the therapist. Researchers also performed citation and reference tracking to uncover further articles that met criteria.

Results of Search

Table 1. Search Strategy of databases.

Search Terms	Date	Database	Initial Hits	Articles Excluded	Total Selected for Review
Date Range: 2017-2018					
"myofascial release" AND Nerve	10/31/17	PubMed	12	11 (1 repeat)	1
"myofascial release"	11/1/17	PubMed	38	37 (2 repeats)	1
"myofascial release"	01/20/18	PubMed	42	42 (2 repeats	0
"myofascial release"	01/20/18	CINAHL	43	43 (2 repeats)	0
"myofascial release"	01/20/18	PEDro	8	8 (2 repeats)	0
"myofascial release"	01/20/18	SPORT Discus	38	38 (2 repeats)	0
"myofascial release"	01/20/18	OTSeeker	0	0	0
"myofascial release"	01/20/18	OT Search	0	0	0
Date Range: 2009-2016					
"musculoskeletal manipulations" [mesh] "myofascial release"	9/21/17 & 10/5/17	PubMed	51	44 (4 repeats)	7
myofascial release AND orthopaedic	10/5/17	PEDro	2	1 (1 repeat)	1
myofascial release AND musculoskeletal disorders	10/5/17	PEDro	5	1	4
myofascial release AND orthopaedic injuries	10/5/17	PEDro	0	0	0
myofascial release AND orthopaedic impairments	10/5/17	PEDro	0	0	0
myofascial release AND orthopaedic pain	10/5/17	PEDro	0	0	0
myofascial release AND orthopaedic trauma	10/5/17	PEDro	0	0	0

myofascial soft tissue mobilization AND orthopaedic	10/5/17	PEDro	0	0	0
Found on ScienceDirect when looking at Ramos-Gonzalez article	10/5/17	NA	99	86 (1 repeat)	13
myofascial release AND orthopaedic	10/5/17	PubMed	13	10 (5 repeats)	3
myofascial release AND orthopedic trauma	10/6/17	PubMed	2	2 (2 repeats)	0
myofascial release AND upper extremity	10/6/17	PubMed	3	3 (1 repeat)	0
myofascial release AND orthopedic	10/6/17	CINAHL	7	5 (2 repeats)	2
myofascial release AND orthopaedic AND injury	10/6/17	CINAHL	0	0	0
myofascial release AND musculoskeletal disorders	10/6/17	CINAHL	2	2 (1 repeat)	0
myofascial soft tissue mobilization AND orthopedic injury	10/6/17	CINAHL	0	0	0
myofascial release AND orthopedic trauma	10/10/17	CINAHL	0	0	0
myofascial release AND orthopedic pain	10/10/17	CINAHL	1	1	0
myofascial release AND musculoskeletal conditions	10/10/17	SPORT Discus	3	3 (1 repeat)	0
myofascial release AND orthopedic injuries	10/10/17	SPORT Discus	0	0	0
myofascial release AND orthopedic impairments	10/10/17	SPORT Discus	0	0	0
myofascial release AND orthopedic trauma	10/10/17	SPORT Discus	2	2	0
myofascial release AND orthopedic pain	10/10/17	SPORT Discus	0	0	0
myofascial release	10/10/17	Cochrane	1	1	0

myofascial soft tissue mobilization	10/10/17	Cochrane	2	2	0
myofascial release AND orthopaedic	10/10/17	Cochrane	1	1 (1 repeat)	0
myofascial release AND orthopaedic impairments	10/10/17	Cochrane	0	0	0
myofascial release AND orthopedic	10/10/17	OT Seeker	0	0	0
“myofascial release”	10/10/17	OT Seeker	1	1 (1 repeat)	0
myofascial soft tissue mobilization	10/10/17	OT Seeker	0	0	0
myofascial release	10/10/17	OT Search	1	1	0
myofascial release AND orthopedic	10/10/17	OT Search	0	0	0
allintitle: “myofascial release” AND orthopedic	10/10/17	Google Scholar	0	0	0
allintitle: “myofascial release”	10/10/17	Google Scholar	276	251 (13 repeats)	25
myofascial release AND orthopedic	10/12/17	PTJ	8	8	0
myofascial release	10/12/17	AJOT	3	3	0
myofascial release	10/12/17	BJOT	0	0	0
myofascial release	10/12/17	CJOT	0	0	0
Date Range: 2000-2008					
myofascial release	10/5/17	PubMed	66	64	2
myofascial release in academic journals	10/5/17	CINAHL	86	78 (1 repeat)	8
myofascial release in academic journals	10/5/17	SPORT Discus	25	25 (5 repeats)	0
myofascial release	10/5/17	Cochrane	1	1	0
myofascial release	10/5/17	OT Seeker	0	0	0
myofascial release	10/5/17	AJOT	2	2	0

myofascial release	10/5/17	J of Hand Therapy	7	7	0
myofascial release in research articles	10/9/17	PTJ	3	3	0
allintitle: “myofascial release	10/9/17	Google Scholar	74	73 (4 repeats)	1
myofascial release	10/10/17	BJOT	1	1	0
Date Range: 1980-1999					
“myofascial release” AND orthopedic AND adult	10/5/17	PubMed	4	1	3
“myofascial soft tissue mobilization” AND orthopedic OR musculoskeletal	10/5/17	PubMed	0	0	0
“myofascial release” AND musculoskeletal AND adult	10/5/17	PubMed	0	0	0
“myofascial release” AND intervention	10/5/17	PubMed	8	5 (3 repeats)	3
“myofascial release” AND therapy	10/5/17	PubMed	13	13	0
“myofascial release” AND adult AND therapy	10/5/17	PubMed	0	0	0
“myofascial release” AND orthopedic OR orthopaedic AND adult	10/5/17	CINAHL	0	0	0
“myofascial release”	10/5/17	CINAHL	18	13 (1 repeat)	5
“myofascial release” AND orthopedic	10/5/17	CINAHL	1	1	0
“Myofascial soft tissue mobilization”	10/5/17	CINAHL	0	0	0
“myofascial release” AND orthopedic OR orthopaedic AND adult	10/5/17	SPORT Discus	0	0	0
“myofascial release”	10/5/17	SPORT Discus	4	3 (1 repeat)	1

“myofascial release”	10/5/17	OT Search	11	11	0
“myofascial release”	10/5/17	OT Seeker	0	0	0
“myofascial release” AND orthopedic	10/10/17	Cochrane	3	3 (1 repeat)	0
“myofascial release”	10/10/17	Cochrane	5	3 (2 repeats)	2
“myofascial release” AND orthopedic injury AND adults	10/10/17	Google scholar	53	52	1
“myofascial release”	10/10/17	AJOT	1	1	0
“myofascial release”	10/10/17	BJOT	0	0	0
“myofascial release”	10/10/17	CJOT	0	0	0
“myofascial release”	10/10/17	JHT	6	6	0
“myofascial release”	10/10/17	PTJ	1	1	0
Total number of initial articles used in review from database searches = 83 (Revised total = 21 after changes made to exclude articles prior to 2000, lower extremity, and self-myofascial release)					

Table 2. Articles from citation tracking.

Article	**Date**	**Database**	**Initial Hits**	**Articles Excluded**	**Total Selected for Review**
Kain et al. (2011)	10/21/17	Google Scholar	25	25	0
Khuman et al. (2013)	10/21/17	Google Scholar	5	5	0
Laimi et al. (2017)	10/21/17	Google Scholar	0	0	0
Nisture & Welling (2014)	10/21/17	Google Scholar	5	4	1
Sata (2012)	10/21/17	Google Scholar	4	4	0
Rodriguez-Fuentes et al. (2016)	10/21/17	Google Scholar	2	2	0
Singh et al. (2014)	10/21/17	Google Scholar	3	3	0
Trivedi et al. (2014)	10/21/17	Google	8	8	0

		Scholar			
Chaudhary et al. (2013)	10/21/17	Google Scholar	4	4	0
Doraisamy et al. (2010)	10/21/17	Google Scholar	4	4	0
Ghandhi et al. (2016)	10/21/17	Google Scholar	0	0	0
Castro-Martin et al. (2017)	10/21/17	Google Scholar	2	2	0
Hou et al. (2002)	10/21/17	Google Scholar	347	347	0
Ajimsha et al. (2014)	10/21/17	Google Scholar	32	32	0
McKenny et al. (2013)	10/21/17	Google Scholar	31	31	0
Parravicini & Bergna (2017)	10/21/17	Google Scholar	0	0	0
Piper et al. (2016)	10/21/17	Google Scholar	12	12	0
Webb & Rajendran (2016)	10/21/17	Google Scholar	4	4	0
Total number of articles used in review from citation tracking = 1					

Table 3. Articles from reference tracking.

Article	**Date**	**Articles Referenced**	**Articles Excluded**	**Total Selected for Review**
Laimi et al. (2017)	11/09/17	28	28	0
Namvar et al. (2016)	11/09/17	37	37	0
Rodriquez-Huguet et al. (2017)	11/09/17	34	34	0
Nisture & Welling (2014)	11/09/17	23	23	0
Khuman et al. (2013)	11/11/17	27	27	0
Kain et al. (2011)	11/11/17	12	12	0

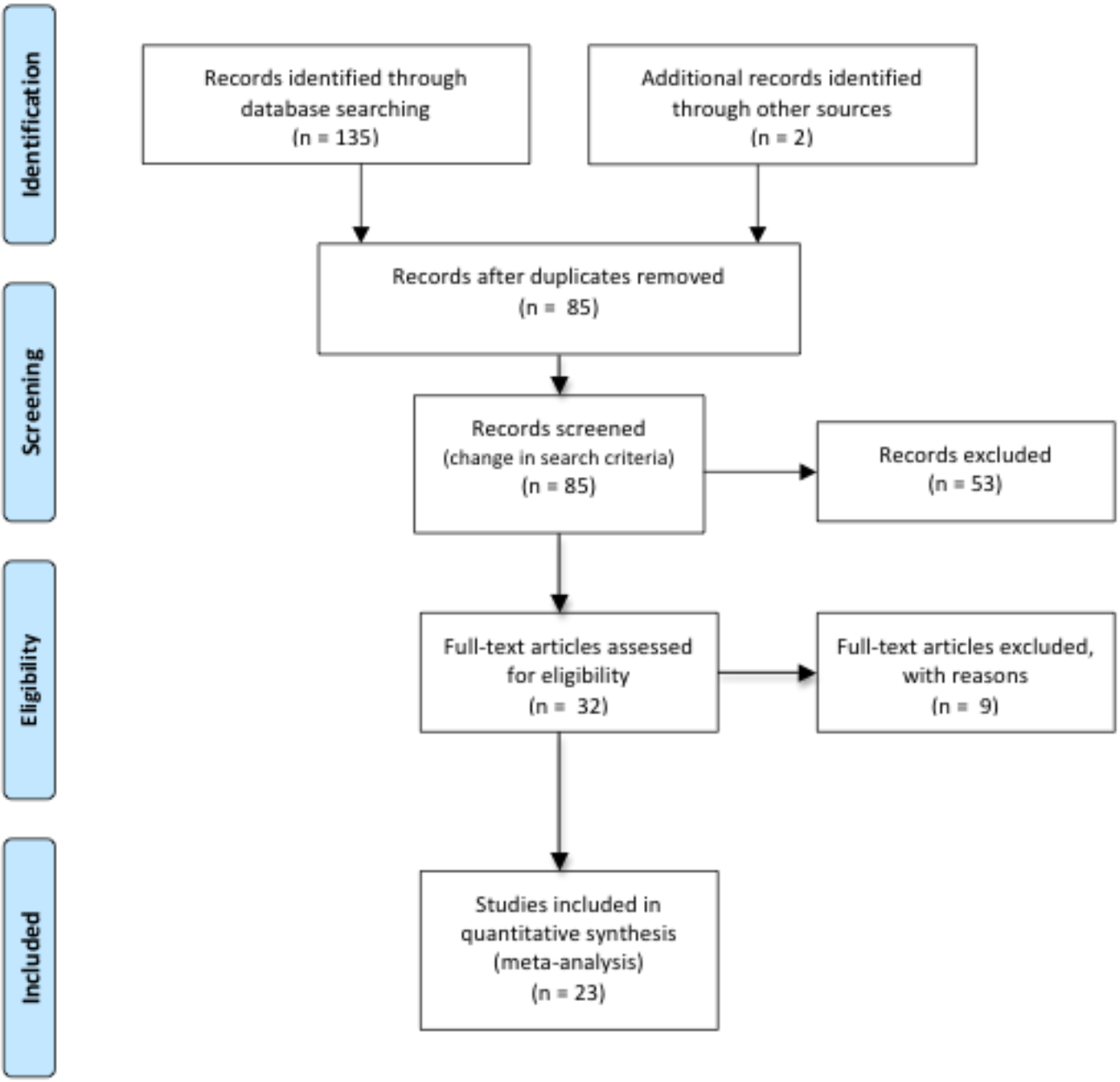
Sata (2012)	11/11/17	25	25	0
Doraisamy et al. (2010)	11/11/17	17	17	0
Gandhi et al. (2016)	11/11/17	32	32	0
Ajimsha et al. (2012)	11/11/17	28	28	0
Castro-Martin et al. (2017)	11/11/17	55	55	0
Singh & Chauhan (2014)	11/11/17	13	13	0
Trivedi et al. (2014)	11/11/17	27	27	0
Kumar & Jetly (2016)	11/12/17	41	41	0
Hou et al. (2002)	11/12/17	49	49	0
Chaudhary et al. (2013)	11/11/17	22	22	0
Rodriguez- Fuentes et al. (2016).	11/11/17	49	48	1
Ajimsha et al. (2014)	11/12/17	37	37	0
McKenney et al. (2013)	11/12/17	15	15	0
Parravicini & Bergna (2017)	11/12/17	61	61	0
Piper et al. (2016)	11/12/17	59	59	0
Webb & Rajendran (2016)	11/12/17	104	104	0
Picelli et al. (2011)	11/12/17	39	39	0
Total number of articles used in review from reference tracking = 1				

Total number of articles used in review from database searches = 21
Total number of articles used in review from citation tracking = 1
Total number of articles used in review from reference tracking = 1
Total number of articles used in review from UPS Master's Thesis = 0
Total number of articles used in CAT = 23

Summary of Study Designs of Articles Selected for the CAT Table

Pyramid Side	Study Design/Methodology of Selected Articles	Number of Articles Selected
Experimental	_5.5_Meta-Analyses of Experimental Trials _14_Individual Randomized Controlled Trials _1_Controlled Clinical Trials _0_Single Subject Studies	20.5 (duplicate with a D1)
Outcome	_0_Meta-Analyses of Related Outcome Studies _0_Individual Quasi-Experimental Studies _0_Case-Control Studies _2_One Group Pre-Post Studies	2
Qualitative	_0_Meta-Syntheses of Related Qualitative Studies _0_Small Group Qualitative Studies _0_brief vs prolonged engagement with participants _0_triangulation of data (multiple sources) _0_interpretation (peer & member-checking) _0_a posteriori (exploratory) vs a priori (confirmatory) interpretive scheme _0_Qualitative Study on a Single Person	0
Descriptive	_0.5_Systematic Reviews of Related Descriptive Studies _0_Association, Correlational Studies _0_Multiple Case Studies (Series), Normative Studies _0_Individual Case Studies	0.5 (duplicate with an E1)
Comments: One systematic review included both experimental and descriptive studies, and was therefore, represented twice in this table indicated by the “0.5” marks above. AOTA Levels I- 20 II- 1 III- 2 IV- 0 V- 0		*TOTAL* = 23

Search Process Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med* 6(7): e1000097. doi:10.1371/journal.pmed1000097

Table Summarizing *QUANTITATIVE* Articles

Author, Year, Journal Abbreviation, Country	Study Objectives	Study Design, Level of Evidence, PEDro score	Participants: Sample Size, Description, Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
MFR Without Treatment Comparison						
Ajimsha et al. 2012 *Arch Phys Med Rehabil* India	To investigate if MFR reduces pain and functional disability of lateral epicondylitis in computer professionals.	Single blind RCT AOTA = I Pyramid = E2 PEDro = 7/10	*N* = 68 Intervention *n* = 33 (1 dropout) Ctrl *n* = 32 (2 dropouts) Mean age = 29.9 56% F **IC:** Computer professionals 20-40 y.o., dx: Lateral epicondylitis on mouse operating arm, pain lasting at least 3 mo, use computer for 50% or more of the work day **EC:** Trauma to affected elbow in preceding 6 wks, hx of elbow instability, elbow surgery, or upper limb/cervical spine pathology, use of	**I:** MFR treatment 30 min 3x/wk for 4 wks. Ctrl group received sham ultrasound therapy for same duration. **O:** *Pain Severity and Functional Disability*: PRTEE	MFR group had greater sig reductions in PRTEE scores ($p < 0.001$). At 4 wks, MFR = 78.7% reduction from baseline, ctrl = 6.8% reduction from baseline. At 12 wks, MFR = 63.1% reduction from baseline, ctrl = 2.2% incr from baseline.	No practitioner blinding. Limited participant information.

			oral systemic steroids/analgesics, other lateral epicondylitis tx in previous 6 mo			
Castro-Martin et al. 2017 *Arch Phys Med Rehabil* Spain	To investigate effects of myofascial induction w/ placebo electrotherapy for cervical/shld on breast cancer survivors.	Single-blind RCT AOTA = I Pyramid = E2 PEDro: 7/10	*N* = 21 Mean age = 50 21 F **IC:** Dx stage I-IIIA breast cancer, ages 25-65, completed adjuvant therapy **EC:** Cancer recurrence, sustained trauma/had surgery in cervical/thoracic /upper limb areas not related to cancer in last 6 mo, not given medical clearance	**I:** 2 sessions (tx and placebo) separated by 4 wk interval, randomly assigned to order of interventions. Tx: 30 min myofascial induction of upper limb Placebo: 30 min shortwave therapy **O:** *Pain:* VAS, *Shld-Cervical AROM:* Goniometer, *Psychological Distress:* Profile of Mood States	Tx resulted in sig decr on VAS affected arm ($p < 0.031$), but not cervical ($p < 0.332$). Sig incr in AROM: shld ER/ABD/IR ($p < 0.001$), cervical rotation ($p < 0.022$) and cervical lateral flex ($p < 0.038$). Not sig for total mood disturbance ($p < .929$).	Small, homogenous sample. No follow-up beyond post intervention.
Doraisamy et al. 2010 *Global Jrnl of Health Sci* India	To investigate effect of MFR in relieving symptoms of chronic tension type headache.	One group pre-post study AOTA = III Pyramid = O4 PEDro = 5/6	*N* = 31 24 F 18-58 y.o. **I:** Headache for at least 3 days/wk for past four wks **E:** Cervical spine surgeries, intracranial causes	**I:** Single session, MFR head and neck muscles **O:** *Pain*: VAS, *Number of headache days/wk*	Sig reduction in number of headache days ($p < 0.001$) and pain ($p < 0.001$) at 1 wk follow-up.	No blinding. Disproportionate number of females. No long-term follow-up.

			to headache			
Namvar et al. 2016 *Int J Med Res Health Sci* Iran	To investigate effectiveness of MFR on pain, disability, max isometric contraction strength and pressure pain threshold in patients with non-specific chronic neck pain	Double blind RCT AOTA = I Pyramid = E2 PEDro = 8/10	*N* = 34 Intervention *n* = 17 Ctrl *n* = 17 Mean age = 36.9 y.o. **IC:** 18-55 y.o., neck pain w/ or w/out shld or unilateral upper limb symptoms for at least 3 mo **EC:** Whiplash w/in 6 wks, hx of cervical spine cancer, fx, or surgery, bilateral upper limb pain, cervical spinal stenosis, positive neurologic findings, long-term corticosteroid use, MFR tx in month before study	**I:** MFR tx 20 mins, 2x/wk for 2 weeks. Ctrl received no tx. **O:** *Pain:* VAS, *Disability:* NDI, *Max Isometric Contraction of Neck Extensors:* Pressure biofeedback device, *Pressure Pain Threshold:* Pressure Algometer	The MFR group had stat sig increase in pain threshold ($p < 0.001$) and extension power ($p < 0.001$) and sig decr in pain ($p < 0.001$) and disability index ($p < 0.001$). MFR group performed stat sig better on all outcome measures ($p < 0.001$) than the ctrl group, except extension power ($p = 0.313$)	Study did not disclose sex of participants. No long-term follow-up.
Nisture & Welling 2014 *Int J Dent Med Res* India	To investigate effectiveness of gross MFR of upper limb and neck in subjects w/mechanical neck pain and referred pain on pain, and	One group pre-post AOTA = III Pyramid = O4 PEDro = 4/7	*N* = 15 Mean age 33.5 y.o. 60% Female **IC:** Dx w/mechanical neck pain along w/referred pain to unilateral upper	**I:** MFR on upper limb and neck for 10-15 min/session, each position held for 90 sec. Following MFR, TENS for 15 min/session. Tx given 1x/day for 5	MFR led to sig improvement in pain ($p = 0.001$), and disability (DASH $p < 0.001$, NPQ ($p < 0.001$)	No ctrl group. Intervention includes both MFR and TENS. Short tx period. Small sample size.

	functional abilities		limb, onset of pain < 1 mo, 20-50 y.o., willing to participate in study. **EC:** Signs of neurological involvement, cervical disc prolapse, cervical spondylosis, spinal stenosis, previous spinal injury, hx cervical trauma, congenital torticollis, frequent migraine, carcinoma, pregnancy	days. **O:** *Pain:* VAS, *Upper Limb Functioning:* DASH, NPQ		
MFR Only vs. Other Treatment						
Gandhi et al. 2016 *Bangladesh Jrnl of Med Sci* Bangladesh	To investigate effectiveness of MFR w/shld taping on subacromial impingement syndrome in collegiate basketball players	Pilot RCT AOTA = I Pyramid = E2 PEDro = 6/10	*N* = 38 Intervention *n* = 19 Ctrl *n* = 19 18-22 y.o. **IC:** Male, basketball player, 18-22 y.o., subacromial impingement syndrome dx **EC:** Hx previous shld injury, tape allergy, skin	**I:** 6 wks Ctrl: MFR only Tx: MFR + taping **O:** *Pain:* numerical pain rating scale, *Functional Ability:* SPADI	Pain: Decr for both groups, tx group had larger decr SPADI: Decr for both groups, tx group had larger decr	Homogenous sample. MFR not described. Number of treatments over 6 wks not clear. Unclear if results were stat sig.

			infections			
Kain et al. 2011 *J Bodywork Mov Ther* US	To compare passive shld ROM after MFR technique and hot pack application.	Single Blind RCT AOTA = I Pyramid = E2 PEDro = 6/10	*N* = 31 Intervention *n* = 18 Ctrl *n* = 13 **IC:** Pain free in dominant UE w/no hx of acute or subacute injury	**I:** MFR technique used: Clavi-pectoral indirect soft tissue three-planar fulcrum release to dominant shld. Tx once in supine position for 3 min. Ctrl group received hot pack applied to dominant anterior shld for 20 min. **O:** *Shld PROM:* Goniometer	MFR led to sig incr in PROM for shld flex (p = 0.001), ext (p = 0.001), and abd (p = 0.001). No sig diff found btw groups in PROM for shld flex (p = 0.187) , ext (p = 0.628), or abd (p = 0.512).	No demographic information. No exclusion criteria. No blinding of therapists or subjects. No long-term follow-up. Interventions only given once.
Picelli et al. 2011 *Eur J Phys Rehabil Med* Italy	To investigate whether MFR is more effective than conventional therapy to improve cervical ROM in patients with subacute whiplash, and to assess if MFR decr neck pain and disability.	Single Blind Pilot RCT AOTA = I Pyramid = E2 PEDro = 8/10	*N* = 18 Mean age 40.5 y.o. 39% Male Group A (MFR) *n* = 9 Group B (conventional) *n* = 9 **IC:** age 18-60, dx whiplash due to MVA, symptomatic w/in 72 hrs of accident, wore soft collar. **EC:** fx or	**I:** Group A: 3, 30 min sessions, every 5 days, for 2wks. Received MFR to head, neck, scapula, and thorax. Group B: 10, 30 min sessions, every 5 days, for 2 wks. 20 min of neck mob exercises + 10 min of neck stretching. Patients evaluated before, immediately after, and two wks post-	Stat sig differences in decr pain and incr cervical active flex at post-tx eval when MFR compared to mobilization exercises (p = 0.03). W/in groups, stat sig incr in AROM on all six AROM parameters among MFR group at post-tx	Small sample size limits generalizability. Lack of long-term follow up. Did not consider direction of head impact from MVA.

			dislocation of cervical spine, amnesia or unconsciousness, secondary accident w/ injuries to head, neck, or thorax, hx of chronic head, neck, thorax pain w/in last 6 mo, sig psych disease, drug or alcohol abuse.	tx. **O:** *Cervical AROM:* Goniometer, *Pain:* VAS, *Disability:* NDI, *Pressure Pain Threshold:* pressure algometer	and follow-up (flex: $p < 0.001$, ext: $p = 0.008$, R lat flex: $p = 0.001$, L lat flex: $p = 0.001$, R rot: $p = 0.004$, L rot: $p = 0.002$), but only two stat sig for mobilization group at post-tx (R rot: $p = 0.003$, L rot: $p = 0.008$) and only R rot stat sig at follow-up.	
Rodriguez- Huguet et al. 2017 *Am J Phys Med Rehab* Spain	To investigate effectiveness of MFR on pain in patients with neck pain	Single blind RCT AOTA = I Pyramid = E2 PEDro = 8/10	*N* = 41 Intervention *n* = 20 Ctrl *n* = 21 (1 dropout at 1 mo follow-up) Mean age 38.02 y.o. 48.78% male Mean mo w/neck pain 3.34 **IC:** 20-60 y.o., both sexes, dx mechanical neck pain > 1 mo **EC:** Neck pain	**I:** MFR tx consisted of 4 diff maneuvers performed 1x/session. Tx occurred 5x over 2 wks, lasting <45min. Ctrl received ultrasound, TENS, and massage 5x/wk for 2 wks. **O:** *Pain:* VAS, *Pressure Pain Threshold:* Pressure	At end of tx change in pain for MFR group was greater than ctrl ($p = 0.021$) w/large btw group effect size ($R^2 = 0.33$). At one month follow-up change in pain for MFR group was greater than ctrl ($p < 0.001$) w/large btw group effect size ($R^2 = 0.29$)	No medium or long-term follow-up.

			from trauma, whiplash, or fx, neoplasia, severe osteoporosis, infectious, or inflammatory process, pacemaker, pregnancy, neck surgery, MFR in previous month	Algometer		
Sata 2012 *Indian J of Physio & Occ Therapy* India	To compare efficacy of muscle energy technique and MFR on trigger point in upper trapezius.	RCT AOTA = I Pyramid = E2 PEDro = 6/10	*N* = 52 Intervention *n* = 27 Ctrl *n* = 25 Mean age 30.12 y.o. **IC:** Pain in neck, 20-50 yo, either sex, dx w/upper trapezius spasm 3wks-3mo, pain felt maximally over upper trapezius region, active trigger point in trapezius, willing to participate in study **EC:** Degenerative neurological traumatic, or cancer conditions, uncooperative pts	**I:** MFR given slowly for 20 sec repeated 3-4x. Applied once daily for 6 days. Ctrl: Muscle energy technique of post facilitation stretching. Applied once daily for 6 days. **O:** *Pain Intensity:* VAS, *Neck Disability:* NDI, *Pain Threshold:* PPT	MFR group performed sig better than ctrl in pain intensity (p = 0.0037), disability (p = 0.0175), and pain threshold (p = 0.0003)	No blinding. No long-term follow-up. Short tx period. Extensive exclusion.

Singh & Chauhan 2014 *J Med Sci & Clinical Res* India	To compare efficacy of MFR and PRT in TTH.	RCT AOTA = I Pyramid = E2 PEDro = 6/10	*N* = 28 Group A (MFR) *n* = 14 Group B (PRT) *n* = 14 **IC:** 25-45 y.o., presence of trigger points in suboccipital area. **EC:** Hx of meds from 1+ yr for TTH, hx of trauma to cervical region, vertebrobasilar insufficiency, hx of cervicogenic head/migraine, malignancy in cervical area.	**I:**Group A: MFR Group B: PRT Each technique done for 2 sessions/wk w/ 3 repetitions for 4 wks total. **O:** *Pain:* VAS, *Disability:* HDI	Both MFR and PRT decr pain and disability for TTH. However, MFR on suboccipital muscle more effective for decr pain and disability in TTH than PRT.	No follow-up post intervention. Lack of statistics reported.
MFR Combined Therapy vs. Other Treatment						
Chaudhary et al. 2013 *Int J Health Sci Res* India	To compare effects of conventional physiotherapy, ART, and MFR on pain, grip strength, functional performance for CLE.	Single-blind RCT AOTA = I Pyramid = E2 Pedro: 8/10	*N* = 45 Group A (*n*=15) Group B (*n*=15) Group C (*n*=15) Mean age = 28.7 25 F **IC:** Ages 20-40, pain in last mo, limited neck movements due to pain, palpable tender spot in upper trapezius	**I:** 5 sessions Group A: MFR (deep transverse friction for 10 min followed by myofascial 3x for 90sec) + exercises Group B: cold pack (20 min) + exercises Group C: exercises only **O:** *Pain:* VAS,	MFR group showed sig improvement in VAS ($p < 0.001$), pressure pain threshold ($p < 0.001$), and AROM ($p < 0.001$) compared to cold pack and exercises group.	No follow-up post intervention. Limited age group.

			EC: Pain from cervical pathology, healing fx over neck or upper back, clotting disorders, wound over neck, shld pathology, degenerative cervical spine	*Pain Pressure Threshold:* Algometer, *Lateral Cervical ROM*: Goniometer		
Hou et al. 2002 *Arch Phys Med Rehabil* US	To investigate immediate effect of physical therapeutic modalities on cervical myofascial pain and trigger-point sensitivity	RCT AOTA = I Pyramid = E2 PEDro = 5/10	*N* = 119 Stage 1 *n* = 48 B1 *n* = 21 B2 *n* = 13 B3 *n* = 9 B4 *n* = 10 B5 *n* = 9 B6 *n* = 9 107 F 30-60 y.o. **IC:** Cervical myofascial pain, palpable MTrPs in single/both sides of upper trapezius **EC:** No neck/shld surgery in past yr, no radiculopathy/myelopathy, no hx of disk disease/degenerative jt disease/fx	**I:** Stage 1 - ischemic compression to determine pain threshold and tolerance pressures of MTrPs in upper trapezius muscles Stage 2 - 6 therapeutic combinations B1 (ctrl): hot pack + AROM B2: B1 + ischemic compression B3: B2 + TENS B4: B1 + stretch w/spray B5: B4 + TENS B6: B1 + interferential current + MFR **O:** *Pain:* VAS, *Pain Threshold:*	Sig decr pain threshold and pain, sig incr for pain tolerance for all 6 txs ($p < 0.05$). When combined w/AROM, heat therapy, and interferential current, MFR sig incr pain tolerance and pain threshold and sig reduced pain when compared to heat + AROM alone ($p < 0.05$) and ischemic compression ($p < 0.05$), but not when ischemic compression is combined w/TENS.	Multiple interventions and combinations make it difficult to understand which therapy is most effective.

			/dislocation of cervical vertebrae, no cognitive deficits, willingness to participate	PThM, *Pain Tolerance:* PToM		
Khuman et al. 2013 *Int J Health Sci Res* India	To investigate effectiveness of MFR to reduce pain, and incr functional performance and grip strength in individuals w/CLE.	RCT AOTA = I Pyramid = E2 PEDro = 7/10	*N* = 30 Intervention *n* = 15 Ctrl *n* = 15 Mean age 37.45 y.o. 56.65% male Duration 8.5 mo **IC:** 30-45 y.o., both genders, CLE > 3 mo, unilateral involvement, NPRS score 4-8 **EC:** Hx of trauma, surgery, acute infections, systemic disorders, cervical spine/UE dysfunction, neurological or, CV disease, osteoporosis, steroid infiltration, ossification and calcification of soft tissue, malignancies, athletes, received physiotherapy w/in	**I:** MFR tx 30 min 3x/wk for 4wks and received conventional physiotherapy program of pulse ultrasound, stretching, and strengthening. 3x/wk for 4wks Ctrl received conventional physiotherapy **O:** *Pain:* NPR, *Functional Disability:* PRTEE, *Grip Strength:* Hand dynamometer	MFR group sig positive decr in pain ($p = 0.001$), incr functional disability ($p = 0.001$), and incr grip strength ($p = 0.001$). MFR group performed sig better than ctrl in pain ($p < 0.001$), disability ($p < 0.001$), and grip strength ($p = 0.001$).	No blinding. No long-term follow-up. Short duration time.

			3 mo, unwillingness to attend all tx sessions and assessments.			
Kumar & Jetly 2016 *Indian J of Physio & Occ Therapy* India	To compare effectiveness of MFR and cyriax manual therapy to decr pain and incr function for lat epicondylitis	Comparative Study AOTA = II Pyramid = E3 PEDro = 5/10	*N* = 30 Group A (ultrasound + MFR) *n* = 15 Group B (Ultrasound + Cyriax manual therapy) *n* = 15 **IC:** Ages 20-50, chronic >2mo, tenderness on palpation, pos Cozen's and Mill's tests **EC:** no previous or current other trauma to elbow, symptomatic arthritis at elbow jt, cervical radiculopathy, absence of tennis elbow signs, corticosteroid inject w/in 3 mo	**I:** Both groups: 12 sessions over 4 wks Group A: 5 min of ultrasound followed by 10 min of MFR Group B: 5 min ultrasound followed by 10 min of cyriax manual therapy (using deep transverse friction massage) **O:** *Pain:* VAS, *Functional Disability:* PRTEE	Both groups showed sig ($p < 0.05$) improvement in VAS and PRTEE scores after 12 tx sessions. No sig differences btw group improvements indicating both tx decr pain and disability.	No blinding. No control group. No long-term follow-up.
Rodriguez-Fuentes et al. 2016	To investigate if MFR in mechanical occupational neck	Single blind RCT AOTA = I Pyramid = E2	*N* = 59 Two therapeutic tx groups: Group 1 (MT) *n* =	**I:** Group 1: MT + analgesic tx Group 2: MFR + analgesic tx	Pain and Disability: stat sig decr in neck pain and functional	Small sample as defined by researchers. No follow-up. Sample

Am J Phys Med Rehab Spain	pain has clinical advantages over a different MT protocol.	PEDro = 8/10	29 Group 2 (MFR) *n* = 30 Mean age = 38.2 56% F **IC:** 18-65 y.o., have mechanical neck pain, score 10% or higher on Neck Disability Index or 2 points or more on VAS at initial eval. **EC:** Neck pain due to neoplasia, metastasis, osteoporosis, infectious or inflam processes, fx, congenital anomalies, herniated disc, whiplash, cervical stenosis, radiculopathy, previous neck surgery, neck pain w/ dizziness, pregnancy, received physiotherapy tx in previous 3 mo	10, 50-min tx sessions for 4 wks. **O:** *Pain:* VAS, *Cervical Disability:* NDI, *QoL:* Short-Form Health Survey, *Craniovertebral Angle and Cervical AROM:* Goniometer	disability for both groups ($p < 0.001$). MFR showed no diff compared w/ MT post-tx. QoL: Group 2 showed stat sig incr on the global Physical and Mental Component Summaries of the Short-Form Health Survey ($p = 0.000$ and $p = 0.000$, respectively). Group 1 showed sig improvements in only two dimensions of the global components (incr physical function, $p < 0.001$; and decr bodily pain, $p = 0.040$). Craniovertebral Angle and Active Cervical AROM: stat sig incr in angle and AROM	only drawn from those w/ occupational neck pain.

					for both groups. Stat sig diff btwn groups observed after 5 tx sessions (incr craniovertebral angle, $p = 0.014$; flex, $p = 0.021$; ext, $p = 0.003$; R side bending, $p = 0.001$; R rotation, $p = 0.031$). Greater stat sig improvement w/ MFR.	
Trivedi et al. 2014 *Int J Physiother & Res* India	To compare effects of conventional physiotherapy, ART, and MFR on pain, grip strength, functional performance for CLE.	RCT AOTA = I Pyramid = E2 PEDro = 6/10	*N* = 36 Three therapeutic tx groups: Group A (ctrl/ conventional physiotherapy) *n* = 12 Group B (ART) *n* = 12 Group C (MFR) *n*= 12 Mean age = 38.3 y.o. **IC:** Ages 30-45, symptomatic chronic lateral epicondylitis, pain intensity btw 3-6	**I:** 12 sessions 3x/wk for 4 wks Group A: ultrasound + exercise program Group B: ultrasound + exercise + ART Group C: ultrasound + exercise + MFR **O:** *Pain:* NPRS, *Strength:* Dynamometer, *Functional Ability:* PRTEE given at baseline and post-tx.	After 4 wks of tx, both ART and MFR groups improved more than ctrl group across all outcome measures ($p = 0.019$, $p = 0.001$, $p = 0.583$, respectively). MFR improved stat sig more than ART, thus MFR is more effective at reducing pain, disability, and improving grip strength.	No long-term follow-up. No blinding.

			on 10 point rating scale **EC:** hx of trauma, surgery, acute infections, malignancy, cervical spine or other UE dysfunction, neurological diseases, CV disease, osteoporosis, recent steroid infiltration, athletes, received physiotherapy w/in 3 mo			

Key to Abbreviations (Alphabetical)

Abbreviation	**Full Phrase**
ABD	Abduction
AROM	Active range of motion
ART	Active release technique
Btw	Between
CLE	Chronic lateral epicondylitis
Ctrl	Control
DASH	Disabilities of the Arm, Shoulder, and Hand
Decr	Decrease
Diff	Difference
EC	Exclusion criteria
Eval	Evaluation
ER	External rotation

Ext	Extension
Flex	Flexion
Fx	Fracture
HDI	Headache Disability Index
Hx	History
I	Intervention
IC	Inclusion criteria
Incr	Increase
IR	Internal rotation
ITB	Iliotibial Band
IThC	Indexes of Changes in Pain Threshold
Jt	Joint
LE	Lower extremities
MFR	Myofascial release
Min	Minute/s
Mo	Month
MRT	Myofascial release therapy
MT	Manual therapy
MTrP	Myofascial Trigger Point
MVA	Motor vehicle accident
NDI	Neck Disability Index
NPQ	Northwick Park Neck Pain Questionnaire
NPRS	Numerical Pain Rated Scale
NSAIDs	Non-Steroidal Anti-Inflammatory Drug
O	Outcomes
PPT	Pressure Pain Threshold - Pressure Algometer
PRT	Positional release therapy
PRTEE	Patient Rated Tennis Elbow Evaluation
PThM	Pain Threshold Meter
PToM	Pressure Tolerance Meter
Pts	Patients

QoL	Quality of life
RA	Rheumatoid Arthritis
RCT	Randomized controlled trial
Shld	Shoulder
Sig	Significant
SPADI	Shoulder Pain and Disability Index
Stat	Statistically
TCA	Tricyclic Antidepressant
TENS	Transcutaneous Electric Nerve Stimulation
TTH	Tension type headache
Tx	Treatment
VAS	Visual Analogue Scale
Wk/s	Week/s
W/	With
y.o.	Years old
Yr	Year

Table Summarizing *Meta-Analyses/Meta-Syntheses/Systematic Review* Articles

Author, Year, Journal Abbreviation, Country	**Study Objectives**	**Study Design, Levels of Evidence of Studies**	**Number of Papers Included, Inclusion and Exclusion Criteria**	**Interventions & Outcome Measures**	**Summary of Results**	**Study Limitations**
Ajimsha et al. 2014 *J Bodywork Mov Ther* Qatar	To analyze RCTs to determine effectiveness of MFR	Systematic Review AOTA = I Range = I Pyramid = E2 PEDro = N/A	*N* = 133 reviewed *N* = 19 selected Databases searched include *MEDLINE, CINAHL, Academic Search Premier, Cochrane Library, PEDro*	**I:** MFR alone, MFR + PNF, MFR + contrast bath + ultrasound, MFR + self-exercise **O:** Hip and shld PROM, pain, foot function, pelvic position, blood	9/19 found MFR better than no tx or sham tx for musculoskeletal and painful conditions. 7/19 found MFR + CT more effective than ctrl groups receiving no tx,	Multiple outcome measures difficult to compare.

			SC: Keywords "myofascial release" and myofascial release therapy". No date limitations. **IC**: RCTs in peer-reviewed journal, 10+ participants, sufficient information to analyze, used MFR as tx, in English, human and adult participants **EC**: Non-RCTs, trigger point therapy, did not use MFR as defined, PNF and MFR w/o explanations	pressure, heart rate, RMDQ, PRTEE, number of days w/o headache, MPQ, QBPDS, muscle stiffness, reaction time, grip strength, functional performance, PPT	sham tx, or CT. 1/19 found MFR inferior to PNF.	
Laimi et al. 2017 *Clin Rehabil* Finland	To analyze of evidence on effectiveness of MFR to relieve musculoskeletal pain, improve jt mobility, functioning level, and QoL	Meta-Analysis AOTA = I Range = I Pyramid = E2 PEDro = N/A	*N* = 124 papers reviewed *N* = 8 selected Databases searched include *Medline*, *Embase*, *CINHAL*, *PEDro*, *Scopus*, and *CENTRAL*	**I:** MFR alone; MFR, back exercises; Fascial manipulation, manual therapy; MFR of tender points; MFR, conventional physiotherapy.	All studies concluded MFR effective in pain reduction and improving functioning. High risk of bias for 5/8 articles. Studies on lateral epicondylitis	Small sample of articles. Studies came from 3 countries and 5 research groups. Incomplete meta-analytic process with no statistics completed on assembled studies.

			SC: RCTs, No date limitations **IC:** Adults w/ chronic musculoskeletal pain, tx MFR, comparison to any other tx, placebo, sham, or no tx, outcome of between group diff in pain intensity/ frequency, ROM, functioning level, QoL. **EC:** Pain associated w/ malignancy or specific neurological disease, tx of non-specific massage, other manual therapies, myofascial trigger point tx.	**O:** Pain intensity or frequency, jt ROM, level of functioning, QoL.	changes in scales evaluating pain and function reached minimal clinical importance in 2 mo follow up. Evidence found to be scarce and inconsistent. High quality RCTs need to be conducted on larger samples w/longer follow-ups.	
McKenney et al. 2013 *J Athletic Training* US	To analyze the literature to determine effectiveness of MFR for orthopedic	Systematic Review AOTA = I Range = I - IV Pyramid = E2, D4	*N* = 88 studies reviewed *N* = 10 selected as eligible w/inclusion/ exclusion criteria applied.	**I:** MFR alone; moist heat pack, MFR, mobilization; trigger-point release, MFR, contract-relax	8/10 studies revealed MFR had positive effects, but not all were stat sig. 2/10 studies showed no	Overall quality of studies was poor to moderate. 6/10 studies were case studies, the others were experimental w/small sample

	conditions.	PEDro = N/A	Databases searched w/no date limitations included *MEDLINE, CINAHL, Academic Search Premier, Cochrane Library,* and *Physiotherapy Evidence Database (PEDro).* **SC:** Studies published in scientific peer-reviewed journals, used indirect and passive MFR as tx for orthopedic conditions, published in English, and studied adults 18 y.o. and older were included.	PNF; MFR, jt manipulation; ultrasound, contrast bath, exercises, MFR; massage, MFR, strengthening **O:** Jt position, decreased pain/ "popping"/ tenderness/ trigger points, activity tolerance, QoL, A/PROM	effect.	sizes. Ethical approval identified in only 5 studies, only 1/6 case studies confirmed participants gave informed consent.
Parravicini & Bergna 2017 *J Bodywork Mov Ther* Italy	To analyze biological effects from direct or indirect manipulation of fascial system for functional outcomes.	Systematic Review AOTA = I Range = N/A Study types not documented. Pyramid = N/A	*N* = 95 articles reviewed *N* = 24 selected as eligible w/inclusion/exclusion criteria applied. Databases	**I:** Direct manipulation: Static stretching, MFR, and "other direct manipulative techniques" including EMG variability induced	In-vitro studies suggest prophylactic MFR (that stimulates fibroblast activity) may regulate inflammation and improve wound healing; clinically,	No statistical analysis implemented for review, may weaken interpretation of results. Only analyzed in-vitro studies, should be

		PEDro = N/A	searched include *Medline, Scopus, Cochrane, Pedro, Ostmed Dr.,* and authors' full article publications on *Fascial Research Congress Website*. **SC:** Exploring biological effects of any form of MFR tx, written in English, written w/in past 10 yrs. Authors searched independently in "phase 1" to ID abstracts that met inclusion criteria. In "phase 2" inclusion criteria were applied to full text.	by massage, MR, high-frequency ultrasound, relationship btw constant sliding, perpendicular vibration, tangential oscillation. Indirect Manipulation: Strain counterstrain (positional release therapy) **O:** Decreased tension, inflammation, maintaining viscoelasticity of connective tissue, scarring & fibrosis post-injury, muscle regeneration, relieving MSD pain and dysfunction	may prevent injury for pts w/risk factors for MSD injury. MFR reversed negative effects of repetitive motion strain for wound closure. Lower magnitude and longer duration (at least 5 min) of MFR improved wound healing (collagen synthesis, secretion). Sustained stretching changed fibroblast shape resulting in large-scale relaxation of connective tissue; clinically, prevention of stiffening tissues improves ROM and reduces pain.	expanded to observe effects of MFR and other manual techniques on human body in conjunction w/biological processes.
Piper et al. 2016 *Manual Therapy* Canada	To analyze effectiveness of soft-tissue therapy compared to placebo/shame tx or no tx for improving funct	Systematic Review AOTA = I Range = I Pyramid = E1 PEDro = N/A	*N* = 9869 articles screened *N* = 6 selected as eligible w/inclusion/exclusion criteria applied.	**I:** MFR vs. sham ultrasound therapy, deep diacutaneous fibrolysis (DF; clinical massage) tx vs. sham superficial DF, MET vs.	MFR and movement re-education (MET) are beneficial for lateral epicondylitis. Relaxation massage (to relax	Only reviewed quantitative outcome measures w/ no considerations for qualitative perspectives for effectiveness of

	recovery and clinical outcomes in pts w/MSD and UE/LE injuries.		Databases searched include *MEDLINE, EMBASE, CINAHL, PsychINFO, SPORTDiscus, Cochrane Central Register of Controlled Trials.* **SC:** Studies from 1990-2015, published in English, RCTs, cohort studies, case-control studies, and inception cohort of min of 30 participants per tx group for RCTs, or 100 subjects per exposed group for cohort or case-control studies. Only quantitative outcomes. Phase one, independent reviewers screened titles and abstracts as relevant, possibly relevant, or irrelevant. Phase two, reviewers viewed	corticosteroid injection (CSI), splint and MFR vs. splint only, trigger point soft tissue therapy + self-stretching vs. self-stretching only. **O:** Self-rated recovery, functional recovery (e.g. return to activities, work, school), clinical outcomes (e.g. disability, pain intensity, health-related QoL), administrated outcomes (e.g. time on disability benefits), or adverse events.	mm, move fluids, reduce pain) combined w/ other modalities (splint, nerve gliding, exercises, etc.) showed short-term benefits for carpal tunnel syndrome. DF not effective for subacromial impingement	MFR.

			full texts to determine eligibility.			
Webb & Rajendran 2016 *J Bodywork Mov Ther* UK	To analyze existing evidence for effect of manually applied MFT on jt ROM and pain on "non-pathological symptomatic subjects."	Systematic Review and Meta-Analysis AOTA = I Range = I Pyramid = E2 PEDro = N/A	*N* = 1046 articles screened; 56 full texts ordered and screened *N* = 9 selected as eligible w/inclusion/exclusion applied. Databases searched: *PEDro, Cochrane Library, NLM PubMed, EMBASE, EBSCOhost, MEDLINE, Psych and Beh Sci Collection, PsychINFO, SPORTDiscus, CINAHL Plus.* **SC:** RCTs, adult human subjects, peer-reviewed published from 2003 to present, objective measure of jt ROM, had differentiated MFTs from other tx. Article excluded were	**I:** Muscle energy technique, strain counter-strain, ischaemic compression, & various MFTs (MFR, neuromuscular technique, & positional release therapy) **O:** *Jt ROM:* tape measure, cervical ROM device, goniometer, calipers; *pain:* VAS, pain component of Oswestry Disability Scale.	All articles concluded that MFT incr jt ROM and reduced pain.	Restricted primary outcome to jt ROM. No outcome measure of pt perspective. Small number of articles w/small samples. Incomplete meta-analytic process with no statistics completed on assembled studies.

			non-RCTs, non-English, in-vitro studies, non-local jt ROM outcomes, non-manual MFR techniques (Graston, dry needling, etc.).			

Key to Abbreviations (Alphabetical)

Abbreviation	Full Phrase
CT	Conventional Therapy
Ctrl	Control
EC	Exclusion criteria
Hx	History
I	Intervention
IC	Inclusion criteria
Jt	Joint
MET	Muscle Energy Technique
MFR	Myofascial release
MFT	Myofascial Technique
Mo	Month
MR	Muscle Repositioning
MPQ	McGill Pain Questionnaire
MSD	Musculoskeletal Disorder
O	Outcomes
PNF	Proprioceptive Neuromuscular Facilitation
PPT	Pressure Pain Threshold
PROM	Passive range of motion
PRTEE	Patient Rated Tennis Elbow Evaluation
QBPDS	Quebec Back Pain Disability Scale
QoL	Quality of life

RCT(s)	Randomized control trial(s)
RMDQ	Roland Morris Disability Questionnaire
ROM	Range of Motion
SC	Search criteria
Sig	Significant
Tx	Treatment

Summary of Key Findings

Introduction. Twenty-three articles addressing the effectiveness of myofascial release (MFR) were included in this examination of a critically appraised topic. MFR was defined for the purposes of this review as being one form of manual therapy technique that specifically manipulates the fascia surrounding muscles through application of a graded, prolonged stretch. MFR may be applied locally or in a more general method depending on the specific needs of the client. Of the included articles, six were Level I systematic reviews or meta-analyses, 14 were Level I randomized controlled trials, one was a Level II two groups, nonrandomized study, and two were Level III one-group, nonrandomized studies. Articles were analyzed for similarities in type of comparison treatment, region of the body, participants, and outcomes. The following themes were identified: MFR without treatment comparison, MFR treatment alone compared to other treatment, MFR combined therapies compared to other combined therapies, and MFR in systematic reviews. The rigor of each article was evaluated using three scales: the PEDro scale (1999), the American Occupational Therapy Association Levels of Evidence (Sackett et al.,1996), and the Tomlin and Borgetto Research Pyramid (2011).

MFR without treatment comparison. Five articles examined the effectiveness of MFR without comparison to another form of equivalent treatment (Ajimsha et al., 2012; Castro-Martin et al., 2017; Doraisamy et al., 2010; Namvar et al., 2016; Nisture & Welling, 2014). Three Level I studies (Ajimsha et al., 2012; Castro-Martin et al., 2017; Namvar et al., 2016) evaluated the effects of MFR by comparing MFR to sham therapy. Ajimsha et al. (2012) and Namvar et al. (2016) found statistically significant reductions in pain and disability when compared to sham therapy. Castro-Martin et al. (2017) found decreased pain in one of two treated areas and a significant increase in active range of motion (AROM) in shoulder and cervical joints. One Level III study found significant improvement in pain and upper limb function (Nisture & Welling, 2014). However, MFR was combined with Transcutaneous Electrical Nerve Stimulation (TENS), which makes it difficult to attribute outcomes directly to MFR. Another Level III study found significantly reduced pain associated with chronic tension headache (Doraisamy et al., 2010). This study only included one treatment session, though,

and headache quantity and pain level was gathered retrospectively through an interview, which could result in inaccurate baseline data. Overall, statistically significant functional improvements were found in the five studies that examined the effectiveness of MFR without comparing MFR to another treatment, providing strong, but limited evidence for MFR.

MFR treatment alone compared to other treatment. Six Level I studies compared MFR therapy alone to another treatment method (Gandhi et al, 2016; Kain et al., 2011; Piecelli et al., 2011; Rodriguez-Huguet et al., 2017; Sata et al., 2012; Singh & Chauhan, 2014). All studies found statistically significant outcomes following MFR treatment and, in addition, significantly better outcomes were found among the MFR groups in five of the six studies compared to other treatments (Piecelli et al., 2011; Rodriguez-Huguet et al., 2017; Sata et al., 2012; Singh & Chauhan, 2014). When compared to positional release therapy (Singh & Chauhan, 2014) and post facilitation stretching (Sata et al., 2012), MFR resulted in greater reductions of pain and disability of muscles of the cervical spine. When compared to ultrasound, TENS, and massage, MFR resulted in greater significant reductions in neck pain (Rodriguez-Huguet et al., 2017). Picelli et al. (2011) found statistically significant differences in pain and cervical active flexion at post-treatment evaluation when MFR was compared to mobilization exercises, with greater significant reductions observed in the MFR treatment group; pain remained statistically significant between groups at follow-up, but active flexion did not. However, within groups, statistically significant increases in AROM were found on all six AROM parameters among the MFR group at post-treatment and follow-up, but only three were statistically significant for the mobilization group at post-treatment followed by one at follow-up. Gandhi et al. (2016) compared MFR alone to MFR with kinesiotaping and found decreased pain and disability levels for both groups, with better results when combined with kinesiotaping; however, it was unclear whether these results were statistically significant. Finally, one study (Kain et al., 2011) did not find any significant differences between MFR and heat modalities on pain, disability, or ROM; yet, the differences were observed in a much shorter duration among the MFR group compared to the group that received heat modalities. These results further provide evidence, although limited by the level of

rigor as determined by the PEDro scale, that MFR is an effective treatment for increasing functional outcomes and may be more effective than other treatments on certain functional outcomes.

MFR combined therapy compared to other combined therapies. Five Level I articles and one Level II article examined MFR combined with another treatment method in comparison to a different treatment method or methods (Chaudhary et al., 2003; Hou et al., 2002; Khuman et al., 2013; Kumar & Jetly, 2016; Rodriguez-Fuentes et al., 2016; Trivedi et al., 2014). Statistically significant improvements in pain, disability, strength, quality of life (QoL), and AROM were found using MFR techniques in all six articles. In two of six studies, MFR groups combined with exercises or conventional physiotherapy were accompanied by significantly more improvement than other treatment groups on all outcome measures, when compared to cold pack plus exercise or conventional physiotherapy alone (Chaudhary et al., 2003; Khuman et al., 2013). When compared to Active Release Technique combined with ultrasound and exercise (Trivedi et al., 2014), greater significant improvements in pain, functional disability, and grip strength were found among the MFR combined with ultrasound and exercise treatment group for lateral epicondylitis.

Mixed results regarding intergroup differences were found in two of six studies. Hou et al. (2002) found greater improvements in pain among the MFR combined group when compared to heat pack, AROM, and ischemic compression, but not when ischemic compression was combined with TENS. Rodriguez-Fuentes et al. (2016) showed no statistically significant group differences for pain and disability when MFR and analgesic treatment were compared to manual therapy and analgesic treatment, but did find greater statistically significant improvements with MFR analgesic therapy for QoL and AROM. In one of the six studies, no statistically significant differences on pain and disability outcomes were found between groups that combined ultrasound with either MFR or deep transverse friction massage (Kumar & Jetly, 2016). These results suggest that while MFR combined therapy resulted in statistically significant positive outcomes, in six of six articles there is limited evidence supporting that MFR combined with other treatment is more effective than exercises alone and inconclusive when compared to other manual therapy and modality combinations.

MFR in systematic reviews. Five Level I systematic reviews and one Level I meta-analysis were examined for the effectiveness of MFR used alone as a treatment, as well as MFR used with other conventional therapies or modalities (e.g., stretching, ultrasound, exercises, nerve glides, etc.). The total number of articles reviewed within all six studies was 76 with 12 of those being identified more than once through the systematic reviews. One systematic review (Parravicini & Bergna, 2017) specifically reviewed in-vitro studies for insight into the physiological changes and effects of MFR use in therapy. The Parravicini and Bergna (2017) article will be considered separately from this synthesis based on the different approach and outcomes of their 24, non-repeated, identified articles.

The 52 reviewed articles (excluding articles from Parravicini & Bergna, 2017) included similar outcomes such as increasing passive range of motion (PROM), function, strength, posture, and QoL; and decreasing pain and disability. All 17 studies reviewed in Laimi et al. (2014) and Webb and Rajendran (2016) reported increased function and PROM, and decreased pain following MFR. No adverse effects were reported in these 17 articles. Additionally, 29 of the 35 articles from Ajimsha et al. (2014), McKenney et al. (2013), and Piper et al. (2016) showed increased PROM, function, strength, posture, QoL, and decreased pain and disability. However, one article reviewed in Ajimsha et al. (2014) found MFR to be inferior to Proprioceptive Neuromuscular Facilitation (PNF). While 8 of 10 articles reviewed in McKenney et al. (2013) showed positive results, the remaining two indicated no effect after MFR treatment. Similarly, while five of six articles reviewed in Piper et al. (2016) showed positive results, one reported adverse effects of transient, mild soreness after the initial MFR treatment which can be expected after putting soft tissue through a rigorous manual therapy session for the first time.

Parravicini and Bergna (2017) reviewed 24 in-vitro studies and concluded that prophylactic MFR stimulates fibroblast activity to regulate inflammation, reverses the negative effects of repetitive motion strain, improves collagen synthesis and secretion for wound healing, and promotes large-scale relaxation of connective tissue due to changes in fibroblast shape. Clinical assumptions were made for application by the observed physiological changes. These assumptions include that MFR may prevent

injury for patients with risk factors for musculoskeletal disorders, limit stiffening of tissues, improve PROM, and reduce pain. Overall, the five systematic reviews and one meta-analysis captured positive and beneficial outcomes from the application of MFR.

Implications for Consumers

Based on the number of articles and level of rigor, there is currently moderate evidence to suggest that MFR may lead to positive outcomes in the treatment of orthopedic and peripheral nerve conditions. Only two articles within a systematic review showed no effect following MFR treatment (McKenney et al., 2013), while only one article across all studies showed mild, transient soreness after the initial MFR treatment (Piper et al., 2016). All other individual studies and systematic reviews found no major negative or harmful results. Nine of 11 studies that compared MFR to other forms of treatment found significantly better outcomes among the groups that received MFR. Although moderate and promising evidence has been reported, there is currently limited research available examining the long term implications of the use of MFR. Ultimately, consumers seeking manual therapy as a method for improving functional outcomes should be informed that MFR treatment does not likely cause any short-term adverse effects and has, up to this point, been shown to result in positive outcomes.

Implications for Practitioners

While limited high quality evidence exists to support the use of MFR when treating upper extremity and cervical orthopedic or peripheral nerve conditions, studies classified as having moderate rigor on the PEDro scale found positive results in regards to pain, disability, range of motion, and quality of life. MFR was found to have better outcomes when compared directly to another form of treatment, but results were inconclusive when different treatments were combined. Often in practice, therapists will use many forms of treatment with a client. One reason to incorporate MFR into treatment would be that it is time efficient, typically only requiring a few minutes per area, and would therefore not only prepare the client more quickly for the remaining treatment, but allow for more billable units during the therapy session. For example, one study (Kain et al., 2011) that found

statistically significant positive outcomes didn't find significant differences in PROM between MFR and the application of heat, but MFR was administered for three minutes and the heat pack was applied for 20 minutes.

Implications for Researchers

Further high quality Level I research is needed to determine the efficacy of MFR when used to treat upper extremity orthopedic and peripheral nerve conditions, such as carpal tunnel syndrome and lateral epicondylitis. This research would fill a gap regarding the limited number of studies currently available that address the upper extremity, and that would be beneficial specifically for hand therapists. Additionally, higher quality randomized controlled trials need to be conducted with the inclusion of larger sample sizes and longer follow-up periods.

Bottom Line for Occupational Therapy Practice/ Recommendations for Better Practice

While moderate evidence exists to support the use of MFR in the upper extremity, the available evidence does suggest that MFR is an effective treatment method for decreasing pain and disability, and increasing PROM, strength, posture, QoL, and overall function. More research is needed within the scope of occupational therapy to determine the effects of MFR, specifically research related to the upper extremity. Currently, most research on MFR has been conducted by physical therapists. It is encouraged that occupational therapists contribute to the research to validate the effectiveness of MFR for the upper extremity.

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Involvement Plan

Introduction

The primary need of our research collaborators, Tomi Johnson and Domonique Herrin, was to inform referring surgeons about the efficacy of myofascial release (MFR), how MFR may help their clients, and thus provide the potential of increasing referral rates. Tomi and Domonique also expressed that they would like to share this information with physical therapists practicing in the same clinic who are skeptical of the benefits of manual therapies.

After some discussion, we decided that knowledge translation would occur through two methods. First, our research team created an informational binder that contained our critically appraised topic (CAT) table with summaries and copies of each article in the CAT for ease of access to the research. Additionally, the binder included a table of contents and was organized using the themes from the original CAT paper (MFR without Treatment Comparison, MFR Treatment Alone Compared to Other Treatment, MFR Combined Therapy Compared to Other Combined Therapies, and MFR in Systematic Reviews). Each included article had a cover sheet identifying the population, treatment comparisons, and key findings.

Second, we disseminated information through an inservice for surgeons and physical therapists where we shared the results of our research. This inservice was an informal twenty minute presentation occurring during the therapists' lunch break. Our collaborating practitioners requested that we create a handout with an overview of our findings for this meeting. To best gauge how the information being presented was received by attendees, we created both a pre- and post-inservice survey. These surveys inquired about the respondents' current level of knowledge of MFR, opinion of MFR, and likelihood to use MFR.

Context

Organizational. The largest hurdle for knowledge translation was reaching the surgeons in a way that was meaningful and applicable to them regarding the research behind MFR. Additionally, whose MultiCare-owned clinic was acquired by Olympic Sports and Spine Rehabilitation, so they will be

undergoing a transition period within the next few months. This could change the organizational structure and access to other MultiCare departments, along with new and differing rules and regulations for holding meetings during working hours.

Departmental. Our research collaborators share clinic space with physical therapists. The physical therapists in their department generally provide intervention through exercise and do not use myofascial release, as they believe exercise is more efficacious than myofascial release.

Individual. Both occupational therapists are trained in and utilizing myofascial release in their current practice, so implementation is already occurring. Our research has validated the continued use of myofascial release in their practice.

Tasks/Products and Target Dates

Task/Product	Deadline Date	Steps w/Dates to Achieve Final Outcome
Create informational binder	04/06/18	Update CAT summaries - 02/20/18 Finalize binder sections & layout - 03/01/18 Purchase binder materials - 03/10/18 Print CAT summaries - 03/15/18 Print articles - 03/15/18 Organize binder - 03/20/18
Provide inservice	04/13/18	Schedule inservice date - 02/28/18 Create inservice handout - 03/20/18 Create pre/post inservice handout - 03/20/18 Divide talking points - 03/20/18

Outcomes of Activities and Evaluation

The long-term outcome of our involvement plan is to increase the number of referrals to occupational therapy, though for the purpose of this project, we will be monitoring the knowledge and opinions regarding MFR among inservice attendees. This will be accomplished by providing attendees a brief survey prior to and following the inservice. These surveys will provide us with information regarding the amount of change in the attendees' knowledge and opinions of MFR and their likelihood of referring for it or incorporating it into practice.

Description of Activities and Products Completed

Informational Binder

An informational binder was requested by our collaborating practitioners as a resource to physicians and the other therapists in the Multicare clinic. Through discussion with our collaborating practitioners, we identified the binder contents to contain the following: cover page, table of contents, executive summary, summaries of every article, copies of each article, and our final CAT table.

The first step to compiling the informational binder was completing final edits to the CAT summaries. These edits included suggestions by our faculty chair and course mentor. After edits were incorporated into the CAT summaries, we created a summary of each of the 23 articles included in our CAT table. These summaries highlighted the research participants, inclusion criteria, outcomes measured, and results. Summaries were reviewed by all group members for accuracy before being incorporated into the binder. Once summaries were approved, a clean copy of article was printed. Each article and summary were filed within the binder in alphabetical order by author within the sections corresponding to the identified theme.

When the research binder was presented to our collaborating practitioners at the time of the inservice, they requested the addition of electronic copies of all articles included in the research project. Articles were electronically compressed in a folder, which was then sent to Tomi Johnson via email.

Inservice

An inservice presentation was requested by our collaborating practitioners to share our findings on the efficacy of myofascial release with other therapists working in their clinic and potentially with referring physicians. While this inservice was requested by the collaborating practitioners, they were uncertain if it would be feasible due to changes in clinic management occurring during the timeline for the knowledge translation portion of the project. While waiting for a date to be scheduled for the presentation, research findings were divided between student researchers and talking points were created, as well as an informational handout, pre-survey and post-survey.

The inservice was scheduled to be held onsite in the collaborating practitioners' clinic on March 30th at 1:20pm. Physical therapists, our collaborating practitioners, and physicians were originally invited to attend. However, due to conflicting schedules, only the clinic's physical therapists and our collaborating practitioners attended the inservice. Prior to beginning the inservice, a pre-survey was administered and collected. Additionally, a brief handout was provided highlighting the main points of our presentation. We provided a 15-minute presentation that included information regarding our research methods, results, implications and limitations. Before administering a post-survey, we allowed time for questions and answers.

Tasks/Products Completion Dates

Task/Product	**Original Deadline Date**	**Actual Date Completed**	**Steps w/Dates to Achieve Final Outcome**	**Actual Completion Date and Comments**
Create informational binder	04/06/18	03/29/18	Update CAT summaries - 02/20/18	Update CAT summaries - 02/20/18. Feedback from our course mentor and faculty chair was incorporated into the CAT summaries.
			Finalize binder sections & layout - 03/01/18	Finalize binder sections & layout - 03/19/18. The writing of summaries for articles were divided between group members and completed by the above date.
			Purchase binder materials - 03/10/18	Purchase binder materials - 03/22/18. Binder materials were donated from one group member.
			Print CAT summaries - 03/15/18	Print CAT summaries - 03/26/18. All CAT summaries were printed by one group member.
			Print articles - 03/15/18	Print articles - 03/26/18. Articles were divided between three group members for printing.
			Organize binder -	Organize binder - 03/28/18. All

			03/20/18	components of the binder were combined just before the
Provide inservice	04/13/18	03/29/18	Schedule inservice date - 02/28/18	Schedule inservice date - 03/13/18. Due to changes occurring in clinicians' clinic, we were not able to schedule an inservice date until this time.
			Create inservice handout - 03/20/18	Create inservice handout - 03/26/18. The inservice handout was started prior to this date, but not finalized until just prior to the inservice.
			Create pre/post inservice handout - 03/20/18	Create pre/post inservice handout - 03/26/18. Drafts of the inservice pre/post survey were begun but not finalized until just prior to the inservice date.
			Divide talking points - 03/20/18	Divide talking points - 03/20/18. Talking points were divided by area of expertise and familiarity within the research.

Outcomes and Effectiveness

A simple pre- and post-survey was administered during the inservice and responses were designed to be answered on a scale of 1-10. The pre-survey consisted of four questions including:

1) What is your current level of knowledge regarding current research investigating the efficacy of using myofascial release to treat musculoskeletal disorders?

2) Based on your current level of knowledge, how likely would you be to recommend myofascial release to a patient with a musculoskeletal disorder to decrease pain?

3) Based on your current level of knowledge, how likely would you be to recommend myofascial release to a patient with a musculoskeletal disorder to increase range of motion?

4) How much do you agree with the following statement: Therapeutic exercise is more effective than intervention using myofascial release for treating conditions related to a musculoskeletal disorder.

The post-survey included the same four questions as the pre-survey, but included the following final question: After learning about research regarding myofascial release are you more or less likely to use myofascial release in practice?

While we believe that the informational binder will be an effective resource for increasing knowledge and comprehension of the available evidence on the efficacy of myofascial release, it is difficult to evaluate the long-term effectiveness of the resource binder. The binder will be available to our collaborating practitioners and the other therapists in the clinic, but utilization is up to their discretion. This resource was delivered to our collaborating practitioners during the inservice presentation. At this time, clinicians expressed appreciation for the resource and interest in referring to articles regarding evidence regarding myofascial release and exercise therapies. We believe that the inclusion of electronic articles will increase the utilization and effectiveness of the binder as a resource as this will increase access and transferability of articles between therapist and other interested parties.

Due to the limited number of inservice attendees, it is difficult to confidently ascertain the effectiveness of our presentation, but the use of a simple pre- and post-survey allowed us to assess the immediate effectiveness of our inservice presentation amongst a small audience. Analysis of responses to

pre- and post-inservice survey questions indicate a positive change in views following the presentation. Following the presentation, survey results indicated there was a 62% average increase in knowledge regarding current research investigating the efficacy of myofascial release. There was an average 20% increase in attendees' likelihood of using myofascial release to treat pain and an average 15% increase in likelihood to use myofascial release to increase range of motion. One attendee responded, "I want to take a class more now" when asked if they were more or less likely to use myofascial release in practice after participating in the inservice presentation. Similarly, when asked the same question, the mean response on the post-survey was a 7.8 (more likely) on a scale of 1-10. When asked, "How much do you agree that therapeutic exercise is more effective than intervention using myofascial release for treating conditions related to a musculoskeletal disorder?" attendees responded similarly in both the pre- and post-survey. When verbally asked a follow-up to this question, attendees responded that it was difficult for them to answer because treatment decisions are guided by multiple factors.

After reflecting on the methods utilized to examine the effectiveness of our binder and inservice presentation, we believe that questions could have been written more clearly to increase our ability to make definitive conclusions regarding the knowledge translation process. To increase our understanding of attendees' viewpoints prior to and following the inservice presentation, we could have included questions regarding their level of practice experience and level of experience using myofascial release, while also including short answer questions to receive qualitative information regarding attendees' viewpoints on the subject matter. To better evaluate the effectiveness of our resource binder, a follow-up email could have been sent to our collaborating practitioners to appraise whether this resource met their needs.

Evaluation of Overall Process and Project

In September 2017, we were pleased to meet our two collaborating practitioners in their Covington outpatient clinic. During our first meeting, we were intrigued to learn of their interest for myofascial release, and whether the research supported the positive results that they were observing in their clinic. MFR being a new treatment topic to all three student researchers, we quickly learned of the nuance in skill required to administer it, and some of the controversies and opinions around whether it truly provided the benefits that practitioners claimed. From their ideas, we were able to develop a question about the efficacy of myofascial release and its credibility when compared to other forms of therapy. The process naturally unfolded and allowed us to move forward to the next stage of our project.

After the research question was generated, our database searches began. This, combined with the construction of the CAT table, was a lengthy and tedious process that required strict organization, attention to detail, and ongoing communication within the group. Fortunately, we developed a systematic way to organize our searches, maintain records of articles, and develop a consistent writing style that helped us manage the process efficiently over two semesters. The consensus of all three researchers was that our similar working styles and desire for high-quality work provided a foundation for success with no major setbacks.

While no major setbacks occurred during the initial search process or construction of the CAT table, our initial project did evolve through the input of our faculty chair, Sheryl Zylstra DOT, MS, OTR/L, and our course mentor, George Tomlin, PhD, OTR/L, FAOTA. With their guidance we refined our inclusion and exclusion criteria, removing articles published prior to the year 2000, articles discussing self-myofascial release or instrument assisted myofascial release, and articles pertaining to the lower extremity. These refinements increased the manageability of the project, reducing the number of initial relative articles from 83 to 21.

The process of working with our collaborating practitioners through presenting our preliminary findings to identifying the most appropriate and useful method of knowledge translation was a streamlined and rewarding process. At each stage the ideas and information presented to our collaborating

practitioners was well received. As graduates of the University of Puget Sound occupational therapy program, our collaborating practitioners appeared aware of the program demands and thus created a feasible, initial question and knowledge translation piece that would fulfill their needs without creating extraneous demands.

Reflecting on the year long research process, we believe there has been a valuable impact on our professional development. Conducting research has instilled in us an understanding of the benefits and importance of evidence-based practice. Furthermore, through the research process we have learned how to search for, evaluate, and synthesize research findings, while also learning time management, communication, and intraprofessional collaboration skills. These skills will contribute to our success as future occupational therapy practitioners.

Recommendations for the Future

Due to the limited number of articles specifically involving the upper extremity, further projects on this same topic may be difficult to implement. However, additional research could be conducted to investigate the use of MFR on the lower extremity as well. We hypothesized that because the fascial system is consistent throughout the body, results found for MFR performed on the lower extremity should be generalizable to other parts of the body as well (e.g., the upper extremity and cervical spine).

Additionally, we excluded articles that examined self-myofascial techniques and instrument-assisted myofascial release in order to specifically investigate therapist-administered techniques. The number of articles that incorporated these techniques indicates a fair increase in popularity and use of these types of MFR. An additional outlet to explore could be comparing the use of instrument-assisted MFR to therapist-administered manual MFR.

Appendix A

Pre/Post Inservice Survey

Please answer the following questions on a scale of 1-10:

1) What is your current level of knowledge regarding current research investigating the efficacy of using myofascial release to treat musculoskeletal disorders?
(1 - no knowledge, 10 - expert knowledge)

1 2 3 4 5 6 7 8 9 10

2) Based on your current level of knowledge, how likely would you be to recommend myofascial release to a patient with a musculoskeletal disorder to decrease pain?
(1 - never recommend, 10 - always recommend)

1 2 3 4 5 6 7 8 9 10

3) Based on your current level of knowledge, how likely would you be to recommend myofascial release to a patient with a musculoskeletal disorder to increase range of motion? (1 - never recommend, 10 - always recommend)

1 2 3 4 5 6 7 8 9 10

4) How much do you agree with the following statement: Therapeutic exercise is more effective than intervention using myofascial release for treating conditions related to a musculoskeletal disorder. (1 - completely disagree, 10 - completely agree)

1 2 3 4 5 6 7 8 9 10

Post question

1. After learning about research regarding myofascial release are you more or less likely to use myofascial release in practice? (1 - not at all likely, 10 - extremely likely)

1 2 3 4 5 6 7 8 9 10

Appendix B

Inservice Handout

Efficacy of Myofascial Release (MFR)

Shelli Chait
Erin Eaton
Tiffany Farley

March 30, 2018

Research Question

In adults with upper extremity and cervical spine orthopedic and peripheral nerve conditions, does myofascial release lead to functional outcomes (such as decreased pain or disability, or increased range of motion, etc.), compared to therapeutic exercises?

Themes

1. MFR without treatment comparison
2. MFR treatment alone compared to other treatment
3. MFR combined therapies compared to other combined therapies
4. MFR in systematic reviews

Conclusions

Based on twenty-three articles and levels of rigor, there is currently moderate evidence to suggest that MFR may lead to positive outcomes in the treatment of orthopedic and peripheral nerve conditions.

All seventeen articles (excluding systematic reviews) found positive outcomes in treatments that included MFR. Nine of 11 studies that directly compared MFR to other forms of treatment found more significant outcomes among groups that received MFR. Only one study documented mild, transient soreness after initial MFR treatment.

Implications

Limited high quality evidence to support the use of MFR when treating upper extremity and cervical orthopedic or peripheral nerve conditions; however, studies of moderate rigor found positive results regarding pain, disability, range of motion, and quality of life.

Further high quality Level I research is recommended to better determine efficacy of MFR when used to treat conditions such as carpal tunnel syndrome and lateral epicondylitis that would be specifically useful to hand therapists.

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