Osteopathic Treatments and the Techniques Used In The Treatment of Acute Mechanical Low Back Pain

Dean Daskalou: B.Sc(Clin Sci)

Student number: 3117353

Primary Supervisor: Dr Jim Kiatos, MBBS., Dip App Sci (Naturopathy)

Victoria University

Osteopathic Medicine Department

C/o 301 Flinders Lane
Melbourne Vic 3000

Abstract:

The efficacy of osteopathic treatments used in acute low back pain (LBP) is largely unknown. The study examined the number of student osteopathic treatments for uncomplicated acute LBP, as well as the specific osteopathic techniques, and combinations of treatments most commonly used.

One hundred and ninety nine patient files form the Victoria University (VU) student clinic were examined. The average number of treatments for LBP was 3.08±1.41, and the most popular combinations of techniques used were soft tissue (ST) and High Velocity Low Amplitude thrust (HVLA) 10.77%. The most commonly used individual technique was ST, incorporated in 75.4% of all treatments performed, with the average number of techniques used per treatment at 2.75±0.6

This study illustrated the average number of treatments as well as treatment techniques and the combinations of techniques student osteopaths used in treating acute LBP at the VU student clinic.

Key words: Osteopathy, low back pain, soft tissue, high velocity low amplitude, techniques.

Introduction:

Back pain, in particular LBP, has afflicted almost all adults at some point of time in their lives. Most people who have suffered an episode of acute LBP have undergone various forms of treatment in order to alleviate the pain, or reduce their symptoms so that they can return to normal functioning.[1]

In the past, the orthodox medical approach to the treatment of LBP has been analgesics, reduced activity, and bed rest for acute attacks.[2] The treatment of LBP using the minimalist approach of the past has been found to increase a patient's recovery time. Studies have shown that bed rest is not an effective treatment, and may delay the recovery of an acute LBP injury. [2-4] A study by Wilkinson *et al*.[3] similarly found that there was no advantage in bed rest for patients with acute LBP. It was shown that by remaining mobile after presenting with acute LBP, patients reported an increase in lumbar flexion after one week from the initial onset of the complaint.

It has been recognized that cases of spontaneous acute LBP will improve within four to six weeks in the absence of any form of treatment.[5] Therefore it is difficult to determine whether a patient's response to treatment is due to the treatment received or the self limiting nature of the condition.

Most musculoskeletal treatment modalities also treat LBP; the treatment approach, however is radically different to that of the orthodox medical model. Osteopathic medicine, in particular, focuses on the need to restore health via the correction of musculoskeletal dysfunctions, and the optimisation of blood circulation whilst allowing the body time to correct these imbalances. In contrast to the orthodox

approach to the treatment of LBP, osteopaths do not have a set treatment protocol. The osteopathic approach to the treatment of LBP varies from patient to patient as it is designed to treat the specific imbalances encountered in each patient. Osteopaths choose the most appropriate from a broad armamentarium of techniques, applying the intervention that is most appropriate. Specifically osteopaths have treated LBP via a variety of physical interventions including myofascial release, articulation, counterstrain etc. [6]

There is a general lack of information on the techniques used for treating LBP. There is much information on specific techniques, such as spinal thrust technique and low back pain[7-10], however little is known regarding the relative frequency or combination of techniques used to treat acute LBP. As a first step in the illumination of this issue the authors decided to explore both the frequency and combinations of techniques used in the treatment of acute, uncomplicated LBP within the student osteopathic clinic at VU.

The techniques, which are taught at VU, and thus, could be employed by students in the treatment of LBP, are as follows:

Myofascial release technique- Treatment is directed toward the soft tissues. Techniques may be active or passive. Active techniques treat the muscle dysfunction directly. Passive myofascial techniques involves the stretching of the involved muscle or fascia causing relaxation or tension release in the tissues.[11]

Articulation: Involves the passive movement of joints of the body through their range of motion.[12]

Counterstrain: A gentle technique that involves finding 'tender points' in muscles, ligaments or tendons. The involved muscle is then shortened via specific positioning, this position is held for at least 90 seconds, or until a tissue texture changes has been palpated.[11]

Functional: Generally indirect and passive. Minimal pressure is applied to the restricted joint with forces initiated that will decrease tissue resistance. The tissue is monitored throughout the technique for subtle changes.[11]

Visceral: This is used to improve the position, circulation and motion of the viscera. Directed toward the viscera specifically, it is especially effective in treating gastrointestinal tract and pelvic organ disturbances.[11]

Muscle Energy Technique: Is a procedure that involves the voluntary contraction of the patients muscle against a counterforce applied by the operator. The aims are to restore joint and muscle motion to their physiological limits.[11,13]

High Velocity, Low Amplitude thrust: Referred as a direct technique, the joint is placed against the restrictive barrier whereby a gentle force is applied to move the joint beyond the pathological barrier.[11]

Cranial technique: Aims to improve the cranial bone motion, as well as balancing the tension membranes of the central nervous system. Referred to as a very gentle technique.[11]

There has been much research conducted into the efficacy of the various treatment approaches that have been used for LBP.[2-6] However little research has been conducted into the efficacy of osteopathic treatment in the management of LBP.

A study by Andersson et al [6] compared osteopathic spinal manipulation with standard care for patients with LBP, in patients with subchronic to chronic back pain. The study showed that results were similar in osteopathic manipulation as compared to the standard care. However it was found that the use of medication was greater in standard care. Osteopathic manipulation techniques applied in the study were thrust, muscle energy, counterstrain, articulation and myofascial release. The treatments were performed by one of three osteopathic physicians. Although an important study, Andersson et al did not investigate cases of acute LBP nor did they consider the number and combination of techniques performed per patient.

Klenerman *et al* [7] studied the number of consultations required to treat LBP by a number of different modalities. The study found that the mean number of visits to an osteopath required for the resolution of a patient's LBP was 5.3. There was no clear delineation between acute or chronic back pain.

The current study was undertaken to address the absence of information regarding the treatment of LBP by osteopaths. Specifically the authors chose to investigate the frequency and combination of techniques used. As LBP is a condition with a plethora of causes and associated pathologies, for the sake of clarity, the authors focussed on acute, uncomplicated LBP.

Ideally, in order to address some of the issues raised, research needs to investigate both the theoretical and practical training received by osteopaths as well as how their approach to the treatment of LBP evolves in time, once they have completed their studies.

This study will look at the approach used by final year osteopathic students in the treatment of acute LBP. The objectives were to investigate the specific type and combinations of techniques used as well as the average number of treatments per episode of acute LBP.

METHODS AND PROCEDURES

This study was designed to identify the number of student osteopathic treatments required in treating uncomplicated LBP before resolution of the condition was achieved. Resolution was defined as the patient being able to return to their individual daily activity, without discomfort as compared to the initial consultation. Such information may give both the patient and practitioner a better understanding of the number of treatments an individual might expect to be incapacitated by acute LBP.

Participants:

This study examined the patient records of the VU Student Osteopathic Clinic. Patient files included in the study dated back from June1994 till November 2001. All the case file records within this period were used in order to achieve statistically significant results. Current files from 2001-03 were excluded as they are needed by treating practitioners and could not be removed from the clinic for analysis.

The collection of data took place in the VU archive storeroom where approximately 2500 files were reviewed for inclusion into the study. Using the inclusion and exclusion criteria 199 files were then selected for the study. The following information was then recorded from the 199 files:

- The number of treatments performed on each patient.
- The techniques employed on every patient for each treatment.
- The combination of techniques performed on every patient.
- If exercises were prescribed .

Permission to access past records for data collection was obtained from the course coordinator and the study was approved by the FOHD Human Research Ethics committee. No patient identifying data was included.

The patient population included records of patients who had an episode of acute LBP within the last 6 weeks. The chronicity of LBP can be described as acute if it has lasted less than 6 weeks, sub-acute if it has lasted 6-12 weeks, and chronic if it has lasted more than 12 weeks.[7]

Measures

The data was collected by directly tabulating the individual techniques and the combinations of techniques used in treating LBP, as well as the number of treatments associated with each episode of LBP for each patient.

The data obtained was reported from 5th year student treatment files. This was done as it was thought that 4th year students may not be confident or adept at using techniques they have recently acquired, as well as having a reduced amount of experience in the student clinic when compared to the 5th year students.

The data was subjective in that the patients reported any changes in the progression of their condition.

Patients that did not attend a follow up appointment were excluded from the study, as it was not possible in these instances to determine the outcome of the treatment.

Procedures

Inclusion Criteria

Patients were deemed eligible for this study if they fulfilled the inclusion criteria outlined below:

Simple backache: (non-specific LBP) Bratton [9]

- Presentation 18-55 years. The age requirement for the project is set at 18-55 years of age. This is due to participants under the age of 18 requiring the consent of a guardian. Patients over the age of 55 will introduce errors by way of the normal degeneration to the body that may not respond to osteopathic treatment.
- Lumbosacral and buttock distribution of pain.
- Muscle or ligamentous sprain/strain, or vertebral facet sprain.
- Patient systemically well i.e. not suffering from a condition or pathology that may interfere with the study.

In some cases it was noted that factors maintaining the patient's injury, such as poor workplace ergonomics or work related activities, did not allow for a full recovery. Recovery was deemed to have occurred when the patient reported a decrease in pain which allowed them to return to their daily activities.

Exclusion Criteria

Patients were excluded from this study if they met the exclusion criteria outlined below:

- Patients with a pre-existing injury or had received some form of manual therapy for the presenting complaint within 3 weeks of receiving treatment at the student clinic.
- Symptoms of LBP were present for 12 weeks or more thus being classified as a chronic condition.
- Treatment from two practitioners or more. Data collected will vary with different treatments performed by different practitioners on the same patient.
- Techniques recorded were those directly used to treat the lumbar spine. There was no tabulation of techniques from practitioners treating pain in related areas such as the sacrum, hips, pelvis and thoracic spine.

Additional presenting symptoms also excluded from the study were non-mechanical back pain defined as:

- Numbness & paraesthesia (altered sensation). Nerve root compression can present with back pain, however it is not classed as simple mechanical acute LBP. [13]
- Localised neurological signs such as numbness and tingling. This included patients presenting with nerve root compression as indicated by

dermatomal pain distribution, or segmental neurological deficit

- SLR (straight leg raise) reproducing leg pain
- Condition worsens with treatment.
- Pain radiates to foot or toes
- Unilateral leg pain worse than the low back pain

Any patient presenting with symptoms and signs indicating the presence of serious pathology were excluded from the study, this included:

- Past history of carcinoma or metastasis to the spine.
- Long term steroid use. This can weaken bone over a period of time therefore affecting the technique of choice during the treatment.
- Unexplained weight loss or malaise. This can be a sign of an underlying condition that may affect a patient's response to treatment.
- Widespread neurological symptoms or signs not confined to the lumbosacral or buttock area.
- Structural deformity

Cauda equina syndrome: One or all symptoms of

- Sphincter disturbance
- Gait disturbance or
- Saddle anaesthesia/paraesthesia.

Results

Following the analysis of over 2000 clinic patient files, 199 were subjected to analysis after the application of the exclusion and inclusion criteria. The sample consisted of 104 males (mean age: 33.75 years) and 95 females (32.66 years).

It was found that the average number of treatments a patient received was 3.08±1.4 per episode of LBP, with a mean number of techniques used per treatment of 2.75±0.6 The data is shown on table 1.

Table 1 Total number and means of treatments and techniques

Number of Treatments		Number of Techniques	
Total Number of Treatment Sessions	613	Total Number of Techniques	1683
Total Number of Patients	199	Total Number of Treatment Sessions	613
Mean Number of Treatments Per Patient	3.08±1.4	Mean Number of Techniques Used Per Treatment	2.75±0.6

A median of 3 and mode of 2 was found for the treatments performed on patients. In addition a total of 112 combinations of treatment techniques were used to treat LBP. Table 2 illustrates the 5 most common technique combinations.

Table 2. Five Most Common Technique Combinations

Techniques Combinations	Number of Cases Treated	Percentage of Total Treatments
ST,HVLA	66	**10.77**
ST,MET,HVLA,ARTIC	44	**7.18**
ST,MET,HVLA	44	**7.18**
ST,MET	42	**6.85**
ST,MET,ARTIC	41	**6.69**

The most commonly used combination was ST(soft tissue) combined with HVLA. ST technique may include massage, kneading and other osteopathic techniques. This combination was incorporated in 66 (10.77%) of all the treatments performed on patients. When incorporating ST and HVLA together with other treatment techniques, this combination appeared in 251 (41%) of all the treatments performed on patients (See Appendix A).

Table 3 illustrates the number of times individual techniques were used in treating LBP.

Table 3 Number of Times Individual Techniques Were Used

Technique Type	Number of Times Technique Was Used In Overall Treatments	Percentage of Individual Technique Used in Total Treatments
ST	462	**75.37**
MET	351	**57.26**
HVLA	335	**54.65**
ARTICULATION	278	**45.35**
STRETCHES	87	**14.19**
COUNTERSTRAIN	61	9.95
INHIBITION	55	8.97
TRACTION	24	3.92
FUNCTIONAL	15	2.45
MYOFASCIAL RELEASE	9	1.47
DEEP FRICTION	5	0.82
CRANIAL*	1	0.16
Maximum Possible	613	100

* Performed by supervising clinician

The most popular technique used in treating LBP was ST. ST was used a total of 462 (75.62%) out of a possible 613 treatments.

In addition to data on the specific techniques employed in the treatment of each patient, it was discovered that 68.3% (n=136) of the patients were prescribed exercises to be performed post treatment. The exercises prescribed were stretches, strengthening, active range of motion as well as global and segmental stabilization exercises.

Discussion:

The study aimed to investigate how students treat LBP in the student clinic at VU. The study found that the average number of treatments for patients with acute mechanical LBP was 3.08±1.41 treatments. By comparison, Shekelle *et al* [1] found that the mean number of patient visits to chiropractors per episode of LBP was 10.4, osteopaths had a mean visit of 5.3 The study did not state the specific type of LBP patients suffered from, hence a direct comparison could not be made.

It was hoped that the collection of data regarding the average number of consultations per patient would have allowed us to comment on the efficacy of the treatment however our study could not comment as to the resolution of acute LBP as the clinic files were vague on a number of points. Firstly the patient files did not include an ongoing quantitative assessment of the patient's condition. Patients verbally recorded whether they felt better or worse following their initial and subsequent treatments. LBP resolution can only be determined if measures were taken to continually monitor and record the patients level of discomfort until there was no further pain recorded. In future such measures should be taken eg a visual analogue pain scale that requires a patient to rate there pain following every consultation until an absence of their LBP is achieved should be included in each case history.

The specific combinations of techniques used per treatment were recorded, giving an understanding of the range of techniques employed by the student practitioners. Overall there was a total of 112 different technique combinations employed by the

students when evaluating the 613 treatments performed. This indicates that the students approach to treating acute LBP is variable and entirely dependant on a per patient basis. However, this does not discount the fact that students, although diverse in their treatment choices, still favour the use of certain techniques such as ST. The results in Table 3 demonstrate ST was used in 462 or 75.4% of the 613 total treatments. The next most popular techniques used were MET 351 (57.3%), HVLA 335 (54.7%) and ARTIC 278 (45.4%), The closest technique used after articulation was stretching with 87 or 14.2 % used in the total number of treatments performed. This indicates that there is a considerable difference between the most popular and those techniques used sparingly by students in the clinic.

This result indicates that ST has been recorded however the types of techniques that fall under the classification of ST is unclear. Our analysis of patient files found that although ST was recorded as a separate technique, which specific techniques were used remains unclear. The assumption that ST refers to massage techniques cannot be made. Future studies need to investigate what the term ST encompasses. By providing levels of description such as kneading with or without lubricant oil, practitioners can then tick the appropriate technique used. Such information can draw the conclusions made on the level of massage and furthermore a differentiation can be made between these and osteopathic techniques performed on patients

The combinations of techniques is important as we get a better understanding of the techniques students are utilizing in their treatments. The results show that the most commonly used technique for treating acute LBP is ST. One possible reason for the

overrepresentation of ST technique may be that many students gain accreditation as masseurs and seek part-time work throughout their university studies.

The osteopathic profession differentiates itself from that of massage therapy,[11,12] and students are therefore encouraged to use ST sparingly, in favour of more appropriate osteopathic techniques. This was illustrated by the recent banning of massage creams and oils within the VU student clinic. This was an attempt by the clinic coordinator to encourage students to divest themselves of massage techniques. The results in table 2 support the contrary, with the information provided indicating that the students in clinic may be performing too much ST.

It was also found that HVLA was most commonly combined with ST for treating acute LBP. The widespread use of ST could be due to the fact that it is a less complex technique to perform by students with limited practical experience. Many techniques require considerable refinement in both their application and result interpretation. Students may not have the tactile skills required to assess subtle changes in tissue texture change. Although HVLA is considered by many to require high-level practical skills, the authors believe that this is balanced by the fact that when HVLA is performed it often results in an audible cavitation which gives both the practitioner and patient and "instant" positive outcome. The authors believe that some techniques are viewed as being empowering to the student. Being able to "crack" a joint imparts a feeling of accomplishment in addition to the instant result (i.e. cavitation).

The clinic co-ordinator has stated that one of the most common complaints from patients is the aggravation of their symptoms due to the over treatment by students.. Our results demonstrate that the average number of techniques per treatment was 2.75±0.6 This however doesn't take into account the time a student will take to perform the techniques during a treatment. It may be that students employ ST as a "fill-in" treatment in an attempt to give the patient "their money's worth" when the required treatment may in fact takes less time to complete.

The study found that in addition to their regular treatment lumbar-specific exercises were prescribed in 136 (68.3%) of the cases studied. Osteopathy is not based on practitioner applied treatments alone. In particular, patients suffering from simple LBP can be advised to continue with strengthening, stretching and stabilization exercises. This information shows that osteopathic care does not stop at treating the underlying somatic dysfunction, but provides the body with the optimum chance of recovery as well avoiding re-injury.

Recommendations for future research:

Future research could be directed into utilising the current files used in the clinic from 2001-2003, and comparing those to the files collected from this study. This would give a comparison on how the treatment from 5th year students has changed over time. The researchers could examine the possible change in the mean number of treatments of patients with acute LBP, as well as the treatment techniques used. At the student clinic there has been a push to reduce the use of generalised soft tissue, and employ specific

direct and indirect osteopathic techniques. Such a study may reflect the effect of the removal of the university supply of sorbolene in late 2001. In addition to factors already discussed, the availability of sorbolene (which is used as a lubricant medium when employing massage techniques) in the student clinic may have inadvertently encouraged the overuse of soft tissue massage. As found in this study, soft tissue was used in 75.4% of the total treatments performed on LBP injuries. As discussed previously we do not know what techniques encompass the reference to ST, therefore by having a list of all ST techniques the students are most likely to perform with or without lubricant mediums, from this we can make conclusions regarding how much students are using ST techniques taught within the osteopathic course, or massage related techniques which have not been taught. An additional area of further research is to not only document the average number of treatments, but also recommend that all subsequent consultations record a visual analogue pain scale for a reliable outcome measure of resolution of pain for future studies.

The mean number of treatments doesn't provide indicate the time period over which the treatments were conducted. Practitioner treatments and the time frame between treatments does vary. This variation is a flaw of the study and could be addressed by recording the time elapsed from the first to the last treatment recorded. This information may provide a better understanding of the time frame a patient can expect to recover from an episode of acute mechanical LBP, and not just the average number of treatments required for the resolution of acute LBP.

Conclusion

This study demonstrated ST to be the most popular technique utilised by students in treating acute LBP. It was found that students are incorporating the use of ST despite the fact that VU clinic coordinators encourage students to use osteopathically trained techniques as shown by the recent removal of massage lubricants supplied to students.

ST is still a favourite of the 5 year students. It could be argued however that the students within this study have undergone the majority of their training while massage lubricants were made available to students and therefore students would be given an incentive to use the lubricants. It would be interesting to see if this trend remains consistent during the years to come following the removal of such lubricants by the university during late 2001.

There appears to be an over servicing of ST as a treatment method, therefore continued measures of removing oils and creams used in the application of ST must continue to be employed, so as not to forget techniques by which osteopaths have gained their qualifications in.

REFERENCES:

1. Shekelle PG, Markovich M, Louie R. Comparing the costs between provider types of episodes of Back Pain Care. *Spine.* 1995; 20;221-7.

2. Waddell G, Feder G, Lewis M. Systematic reviews of bed rest and advice to stay active for acute low back pain. *British Journal of General Practice* 1997; 47: 647-652.

3. Wilkinson MJB, Does 48hrs bed rest influence the outcome of acute low back pain? *British Journal of General Practice* 1995; 45: 481-484.

4. Malmivaara A, Hakkinen U, Aro T, and co-workers. The treatment of Acute Low Back Pain- Bed Rest, Exercises, or Ordinary Activity? *The New England Journal of Medicine* 1995; 332: 351-356.

5. Kirchner, JT. Osteopathic Manipulation vs. Standard Care for Back Pain. *American Family Physician* 2000;61: 1502-3.

6. Andersson GBJ, Lucente T, Davis AM, Kappler RE, Lipton JA, Leurgns S. A comparison of Osteopathic spinal manipulation with standard care for patients with low back pain. *The New England Journal of Medicine* 1999; 341: 1426-31.

7. Klenerman L, Slade PD, Stanley IM, and co workers. The prediction of Chronicity in Patients with Acute Low Back Pain in the General Practice setting. *Spine* 1995; 20: 478-484.

8. Koes BW, Assendelft WJJ, Van der Heijden GJMG, Bouter LM. Spinal Manipulation for Low Back Pain. *Spine* 1996; 21: 2860-2873.

9. Bratton, RL. Assessment and Management of Acute Low Back Pain. *American Family Physician 1999*; 60:2299-308.

10. Patel AT, Ogle AA. Diagnosis and Management of Acute Low Back Pain. *American Family Physician 2000*; 61: 1779-86,17989-90.

11. Di Giovanna EL., Schiowitz S, Dowling D. *An Osteopathic approach to diagnosis and treatment*. 2nd ed. Philadelphia: Lippincott-Raven.; 1997.

12. Kuchera WA, Kuchera ML. *Osteopathic Principles in Practice*. Rev 2nd ed. Ohio: Greyden Press.; 1994.

13. Greenman PE, *Principles of Manual Medicine*.2nd ed. Philadelphia: Williams and Wilkins Co.;1996.

Appendix A Total frequency of combinations of techniques

Technique Combinations	No. Of Times Appears	Percentage of Total Treatments
ST,C/S	1	0.16
ST,MYOFASCIAL RELEASE	1	0.16
ST,MET,FUNCTIONAL	1	0.16
ST,MET,DEEP FRICTION	1	0.16
ST,HVLA,MYOFASCIAL RELEASE	1	0.16
ST,ARTIC,MYO RELEASE	1	0.16
ST,C/S,FUNCTIONAL	1	0.16
ST,C/S, TRACTION	1	0.16
ST,C/S,MYO RELEASE	1	0.16
ST,STRETCH,INHIBITION	1	0.16
ST,MET,HVLA,FUNCTIONAL	1	0.16
ST,MET,HVLA,MR	1	0.16
ST,MET,HVLA,TRACTION	1	0.16
ST,MET,ARTIC,DEEP FRICTION	1	0.16
ST,MET,ARTIC, INHIBITION	1	0.16
ST,MET,C/S,FUNCTIONAL	1	0.16
ST,MET,C/S,DEEP FRICTION	1	0.16
ST,MET,C/S, TRACTION	1	0.16
ST,MET,STRETCH,DEEP FRICTION	1	0.16
ST,MET,STRETCH,MYO RELEASE	1	0.16
ST,MET,HVLA,ARTIC,DEEP FRICTION	1	0.16
ST,MET,HVLA,ARTIC, INHIBITION	1	0.16
ST,MET,HVLA,ARTIC, TRACTION	1	0.16
ST,MET,HVLA,C/S,STRETCH	1	0.16
ST,MET,ARTIC,C/S,STRETCH	1	0.16
ST,HVLA,ARTIC,C/S	1	0.16
ST,HVLA,C/S,STRETCH	1	0.16
ST,HVLA,C/S,INHIB	1	0.16
ST,ARTIC,STRETCH,INHIBITION	1	0.16
ST,ARTIC,STRETCH,TRAC	1	0.16
ST,HVLA,ARTIC,STRETCH,TRAC	1	0.16
ST,HVLA,ARTIC,INHIB,TRAC	1	0.16
ST,MET,HVLA,ARTIC,STRETCH,TRAC	1	0.16
MET,STRETCH	1	0.16
MET,FUNCTIONAL	1	0.16
MET,INHIB	1	0.16
MET,HVLA,C/S	1	0.16
MET,HVLA,INHIB	1	0.16
MET,HVLA,FUNCTIONAL	1	0.16
MET,ARTIC,STRETCH	1	0.16
MET,STRETCH,MR	1	0.16
MET,HVLA,ARTIC,C/S	1	0.16
MET,HVLA,ARTIC,INHIB	1	0.16
MET,HVLA,C/S,INHIB	1	0.16
MET,ARTIC,C/S,MR	1	0.16

MET,ARTIC,STRETCH,FUNCTIONAL	1	0.16
MET,HVLA,ARTIC,C/S,STRETCH	1	0.16
MET,HVLA,ARTIC,STRETCH,FUNCTIONAL	1	0.16
MET,HVLA,C/S,STRETCH,MR	1	0.16
MET,HVLA,STRETCH,INHIB,TRAC	1	0.16
HVLA,C/S	1	0.16
HVLA,FUNCTIONAL	1	0.16
HVLA,ARTIC,C/S	1	0.16
HVLA,ARTIC,STRETCH	1	0.16
HVLA,C/S,STRETCH	1	0.16
HVLA,ARTIC,C/S,STRETCH	1	0.16
ARTIC,FUNCTIONAL	1	0.16
ARTIC,CRANIAL	1	0.16
C/S,MYO RELEASE	1	0.16
TRACTION	1	0.16
ST,INHIBITION	2	0.33
ST,MET,TRACTION	2	0.33
ST,MET,C/S,STRETCH	2	0.33
ST,MET,HVLA,ARTIC,C/S	2	0.33
ST,MET,HVLA,STRETCH,INNHIBITION	2	0.33
ST,HVLA,ARTIC,TRAC	2	0.33
MET,ARTIC,C/S	2	0.33
MET,ARTIC,TRAC	2	0.33
MET,ARTIC,FUNCTIONAL	2	0.33
ST,STRETCH	3	0.49
ST,MET,INHIBITION	3	0.49
ST,ARTIC,STRETCH	3	0.49
ST,ARTIC,C/S	3	0.49
ST,ARTIC,TRACTION	3	0.49
ST,MET,STRETCH,FUNCTIONAL	3	0.49
ST,MET,HVLA,ARTIC, STRETCH	3	0.49
ST,HVLA,ARTIC,INHIB	3	0.49
MET,HVLA,ARTIC,STRETCH	3	0.49
HVLA,STRETCH	3	0.49
HVLA,ARTIC,INHIB	3	0.49
HVLA,C/S,INHIB	3	0.49
ST,HVLA,INHIBITION	4	0.65
ST,MET,HVLA,C/S	4	0.65
ST,MET,ARTIC,C/S	4	0.65
MET,C/S	4	0.65
MET,HVLA,STRETCH	4	0.65
ST,ARTIC,INHIBITION	5	0.82
ST,MET,ARTIC, TRACTION	5	0.82
ARTIC	5	0.82
ARTIC,INHIBITION	5	0.82
ST,MET,HVLA,INHIBITION	6	0.98
MET,ARTIC,INHIB	6	0.98
ST,MET,C/S	7	1.14
ST,MET,HVLA,STRETCH	7	1.14
ST,HVLA,C/S	8	1.31