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Role of various mobilization maneuvers in the management of low back pain

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ABSTRACT

A Mechanical Low back pain is a disorder associated with mal-alignment or malfunctions related to the lower Spinal Column. It may indulge injury of a Lumbar column of Spine, although in most cases the etiology is idiopathic. It is a very common musculoskeletal disorder. It has been evaluated as one of the most common and important disorder to infest the working population. The main objective of this review manuscript is to present an overview of preferred practices for managing the Mechanical low back pain and to enlighten the lack of consensus therapist and people face regarding cause and conservative treatment of Mechanical Low back pain. The following study is designated as a literature review of relevant text and studies published. The conclusion derived from the following review manuscript is that the different physical therapist prefers different schools of thought for mobilization; however Maitland management and McKenzie management maneuvers are in fact the management approaches of choice and thus most commonly implemented.

KEYWORDS

Lumbar;
Idiopathic;
Musculoskeletal;
Maitland;
McKenzie.

INTRODUCTION

What is mechanical low back pain?

It is a disorder associated with low back pain which comprises of non specified injuries of the lumosacral spinal column; although in most of the cases the etiology is idiopathic. The pain is "Mechanical" in nature and it varies with physical activity (example: prolonged sitting, bending forward) and with time. The pain is mainly located in the Lumbosacral region of the spinal column, groin and thigh region and is not associated with neurological irritation to the foot or toes[1,2].

(a) Incidence

- Mechanical low back pain is extremely common, affecting between 70% and 80% of world wide adults at some point of their lives.
- An estimated 2 billion working days in a year are lost due to Mechanical low back pain.
- Mechanical low back pain complaints are second only to the upper respiratory tract infections as a cause of disability in patients younger than 38 years of age.
- Mechanical low back pain could represent 85% among the patients reported with the problem of simple backache. Mechanical backache affects,

60% - 90% of the population at any time of their lives.

(b) Etiology

- Mechanical or activity associated etiology.
- Myofascial or soft tissue injury/ disorder/ strain (Non specific back pain).
- Mechanical low back pain consists of unspecified injuries to the lower section of the spinal column.
- Spinal pathologies
- Neurological involvement
- Non specified low back pain
- It can also be classified as acute, sub acute and chronic depending on duration of symptoms[1,3,4].

(c) Treatment

- There are numerous treatments maneuvers and approaches widely used and studied. Manual therapy and mobilizations of the vertebral column are most popular among them.
- Manual therapy refers to any intervention that incorporates the use of physical therapist's hand on the vertebral column. It is considered as the core skill of the physiotherapists[5].
- A recent trial has revealed that motor control exercises and spinal manipulative therapy (joint mobilization or manipulation techniques applied to the spine column or pelvis) they seem to produce a slightly better short term function and short term perception of the global effect of treatment, but not better medium or long term effects[6], in patients with chronic nonspecific low back pain.

(d) Duration of pain and treatment methods

- Acute Low back pain: There is a slight evidence that spinal manual therapy provides more short term pain relief than mobilization and detuned diathermy, and limited evidence of faster recovery than a commonly used physical therapy treatment strategy[3,7,8].
- Chronic low back pain: There is a moderate evidence that spinal manual therapy has a suitable effect similar to an efficacious prescription based Non steroidal anti inflammatory drugs, spinal manual therapy/ mobilization is effective in the short term when compared with placebo and general practitioner care and in the long term when compared to physical therapy. Though, there is limited evidence that mobilization has inferior results as compared to back exercise after disc herniation surgery.
- A combination of acute and chronic low back pain: Evidences suggest that Spinal manual therapy/ Mobilization provides either similar or better pain outcomes when they are put in comparison to placebo and other treatment maneuvers, such as McKenzie therapy, medical care, management by physical therapists, soft tissue treatment etc.[1,9] .

(e) Popular treatment methods among physical therapist

- Several physical therapists were requested for their opinions on the various approaches to low back pain namely Cyriax management method, Mckinzie management method, Myofascial release[5] and other approaches specified by the therapists.

Common findings

- Paraspinal muscle tenderness.
- Paraspinal muscle spasm.
- Symptoms exaggerated by forward flexion, relieved by rest.
- List to one side (variable).
- Normal neurological examination, pain confined locally in the lower back area.

Differential diagnosis (Conditions that may mimic musculoskeletal or mechanical low back pain)[10-14]

- Vascular conditions example- Abdominal arterial aneurysm.
- Gynecological condition example- Endometrosis.
- Genitourinary condition example- Prostatitis.
- Gastrointestinal conditions example- Pancreitis.
- Rheumatalogic condition example- Fibromyalgia.
- Metabolically Impairments example- Osteoporosis.

Risk factors

(a) Individual factors

- Age
- Sex
- Anthropometric factors
- Patient's general conditions
- Low back pain references

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- Lifestyle habits
- Other individual factors (Radiological disorders, Congenital deformities, Pregnancies)

(b) Occupational factors[14-15]

- General factors
- Dynamic weight
- Resting weight
- Vibrations associated example- Construction workers
- Other occupational factors example- increased working time, aid possibilities and period of time with profession.
- Sedentary jobs example- Computer operators, sitting related jobs.

Classification

The most widely acknowledged methods of classification for low back pain is a diagnostic triage, where patients are distinguished as falling into one of the three groups.

With respect to the value of specific evaluation and treatment approaches, the compiled weighted sample estimated that 85% of therapist perceived the McKenzie method was moderately more efficient. The McKenzie method was rated as the "most useful" approach by 48% of therapist[16-20].

The Myofascial release is rated as the most appropriate by 5% of the therapists; the Cyriax treatment approach is rated as most useful by 5% of the therapists and 44% of the therapists cited a variety of other treatment maneuvers such as patient education, postural advice, following Maitland principles, pelvic stabilization and various stretching, strengthening and conditioning exercises.

Physical therapists employed in the private sectors emphasized more on the Spinal mobilization maneuvers for patients with acute recurrent low back pain in comparison to the physical therapists employed in the other clinical settings[5,9].

Specific treatment maneuvers approach

McKenzie Technique

The basic principles of this approach can be underlined as follows:

1) McKenzie utilizes the response of a patient for the repetition of all four basic movements of the Lumbar spine. Identifying the movements that reduces the pain or bring about its centralization (movement of peripheral pain towards the spinal mid line) this forms the basis of the therapy, thus known as Movement therapy.
2) He also stresses the importance of maintenance of the normal physiological curve of lumbar lordosis in all body positions and activities, besides back ergonomics. Prolonged flexion postures elongate the posterior tissues like posterior longitudinal and supraspinous ligaments, the facet capsules, posterior annular fibers of the disc thus putting excessive pressure on the anterior surfaces of the vertebral bodies. This forces the nucleus pulposus posteriorly causing nuclear bulging or some herniation. Whereas, the lordosis of the lumbar spine is 'Physiological' this forces the nucleus anteriorly, away from the neural components of the spinal canal. Therefore, this approach lays emphasis on maintenance of the lumbar lordosis[21].
3) This approach categorizes the origin of low back pain due to three principle pathological conditions and is termed as:
   - Derangement Syndrome
   - Dysfunction Syndrome
   - Postural Syndrome.

   Derangement syndrome

   In this syndrome, the anatomical disruption or displacement occurs within the intervertebral disc. In the younger age group there is displacement of the annulus complex or the fluid nucleus, whereas in older groups degenerated annulus or fibrosed nucleus may be present[11,22].

   The disc arrangement may be:

   - Minor or major posterior disc disturbance.
   - Minor or major posterior lateral disc disturbance with impingement of nerve root or dural sleeve with sciatica with or without deformity.
   - Anterior or anterior lateral disc disturbance.

   Dysfunction syndrome

   The incidence of low back pain due to dysfunction syndrome is common in the age group of 30 years. Lack of exercise, poor postural habits or organization of fibrous collagenous scar tissue during the process of repair may be

precipitating factors. Pain is felt only at the extreme range of movements due to overstretching of the shortened soft tissues.

Postural syndrome

It is common in younger age groups (below 30). The pain is present adjacent to the spine. The cause may be overstretching of the normal tissues because of poor sitting or standing postures or due to lack of stretching exercises in the sedentary professions. There is no pathology, no loss of movements[3,8,13].

Techniques

- Lying prone
- Lying prone in extension
- Extension in lying
- Extension in lying with belt fixation
- Sustained extension
- Extension in standing
- Extension mobilization
- Extension manipulation
- Rotation mobilization in extension
- Rotation manipulation in extension
- Sustained rotation/ mobilization in flexion
- Rotation manipulation in flexion
- Flexion in lying
- Flexion in standing
- Flexion in step standing
- Correction of lateral shift
- Self correction if lateral shift

Evidences[23-27]

More than 60% of therapists inducted the McKenzie evaluation method for all three kinds of patients (acute, sub acute, chronic) and Sacroiliac joint screening, functional activity and joint accessory movement evaluations for the patients with acute recurrent symptoms. With respect to the value of absolute evaluations and management approaches, the combined weighted sample estimated that 85% of the physical therapists perceived the McKenzie treatment approach as moderately to very effective. The McKenzie method is accredited as the most useful approach by approximately 50% of the physical therapists. The McKenzie method is said to be the most popular approach for managing patients with back pain. The McKenzie approaches are the most frequently used types of physiotherapy management approach for back pain and probably neck pain. The sole aim of the management approach is to evaluate a directional preference for spinal movement and can form the basis for prescription of exercises. Improvement in symptoms is subsequently assessed in terms of 'centralization' a phenomenon that has been documented quite well. The McKenzie approach for the neck and the low back pain backs up just a little evidence in terms of randomized trials. A large trial of sub acute and chronic back pain patients found out that McKenzie approach, when compared with intensive dynamic strengthening exercises. It showed to be slightly more efficient for the duration of 2 months in improving the function but the difference was not maintained for the long term. A recent transcript review of six trials concluded that there is a slight evidence for the effectiveness of McKenzie management approach for sub acute and chronic back pain patients, at least in the short term. The McKenzie management approach, especially for the sub acute and chronic back pain patients, has the potential advantage of encouraging self help and there is a slight evidence for its effectiveness, at least in the short term. Another research transcript concluded that a few improvements appeared in all groups for the low back pain, disability. The OMT and the McKenzie approach groups showed no consistent treatment effects at different follow up points when only compared with the advice only groups in the heterogenic non specified Low back patients. Though, a slight trend emerged that the OMT and McKenzie methods group showed some small treatment effect compared with the advice only group. A prospective RCT in which McKenzie program was shown to be twice as effective as traction and back schools in alleviating back pain.

Maitland techniques

The main features of Maitland concept:

- The continuous analytical assessment before, during and after the application of each technique during each treatment session throughout treatment.
- The gentleness of the initial treatment.
- The symptomatic responses, both during and after the application of treatment must be assessed and analyzed before processing.

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Maitland's grades of oscillatory mobilizations:

- Grade 1: Small amplitude movement performed at the beginning of motion.
- Grade 2: Large amplitude movement performed within the range.
- Grade 3: Large amplitude movement performed up to the limit of the range.
- Grade 4: Small amplitude movement performed at the limit of range.
- Grade 5: High velocity thrust performed at the limit of the range.

Techniques[28]

- Posterior anterior central vertebral pressure.
- Posterior anterior vertebral pressure as combined movement, in lateral flexion.
- Anterior posterior central vertebral pressure.
- Posterior anterior unilateral vertebral pressure.
- Transverse vertebral pressure.

Evidences

- Gentle conservative treatment approaches, such as Maitland's mobilizations are frequently used by physical therapists, applying pressure by the hands of the physical therapists to move the vertebral joints passively through a given range.
- The conclusions drawn from several systematic review transcripts have been somewhat unclear, mainly because of a dearth of high quality trials. One large national study carried out in the United Kingdom recently found out that primary care patients randomized to a spinal manipulation package, in addition to exceptional care GP management, reported modest but significant benefits compared with the patients who only received best care GP management.
- The Physical therapy staff at a hospital in an Outpatient Department is seen most often administering Maitland's therapeutic approach or soft tissue manipulations or both.

Mulligan management technique

- Mulligan pioneered a relatively new concept in manual therapy, these maneuvers are determined as Mobilizations with movement (MWMs) or as Sustained natural apophyseal glides (SNAGs).
- In the case of lumbar spine Mobilizations with movement, the techniques involve the application of an accessory glide along the plane of zygapophyseal (facet) joint in a weight bearing position during active movements.
- Mulligan proposes that these spinal techniques improve signs and symptoms by directly facilitating the restricted mobility of the facet joints and simultaneously influencing the mobility of the intervertebral joints.
- The clinical appropriateness and effectiveness of these techniques are based upon whether they can bring about immediate changes in perception of pain and spinal mobility in a pain free manner.
- Recent evidence based study in Canada specifically investigated the use of Mobilizations with movement techniques in low back pain management to explain the practice of physical therapists and explore the reported outcomes of Mobilizations with movement. The findings suggested that one in three physical therapists currently involved in low back pain management uses mobilization with movements as part of his/her treatment approach and that physical therapists use their clinical decisional ability to select subjects whom they feel might benefit from these techniques.
- Physical therapists reported that the most common effects seen immediately after the use of mobilizations with movements were increased in the patient's range of motion.
- The evidences from the study suggest that flexion Mobilizations with movements produced a statistically significant immediate improvement in range of motion as compared to placebo intervention for true and total lumbar spine flexion, but not for the total lumbar spine extension or pain scores.

Muscle energy technique approach

- Muscle energy technique is an active maneuver in which the patient instead of care provider supplies the corrective force himself/herself.
- Greenman defined Muscle energy technique as a manual medicine treatment procedure that involves the voluntary contraction of patient muscle in a precisely controlled direction and manner, at varying levels of intensity applied against a distinctly executed counterforce applied by the physical thera-

pist.

- It has been hypothesized that Manual muscle technique can be used to lengthen and strengthen the muscles to increase fluid mechanics and decrease local edema, and to mobilize a restricted articulation.

Evidence[28,29]

Results derived from a pilot study suggested that Muscle energy technique combined with supervised neuromuscular re-education and resistance training exercises may be superior to supervised neuromuscular re-education and resistance training exercises alone for decreasing disability and improving function in patients with acute low back pain.

Cyriax treatment maneuver

- According to Cyriax management maneuver, low back pain without sciatica is secondary to the blocking effect of a disc protrusion on the motion in the involved segment, back pain with local or groin reffered symptoms is related to dural involvement or neural irritation caused by a protrusion that is affecting the related nerve root[30-32].
- Muscular pain, sacral joint pain and pain in the groin are referred.
- Patterns and are not treated except by treatment of disc lesions.
- The treatment recommended by him is manipulated for the 'hard' or annular protrusions, lumbar traction for 'soft' or nuclear protrusions and epidural steroids for persistent radiculopathy.
- Cyriax also advocate "Soft Tissue Manupilation".

Williams flexion exercises

- The therapeutic goal to strengthen the lumbar spine flexors and stretch those muscles and Ligamentous structures that tend to hold the spine in extended position.
- Curl UPS
- Pelvic tilt
- Knee
- Hip flexors stretch with the extended pre lordotic position of the spine.

Preventive measures for mechanical backache at work[30-34]

- Training and education
- Worker training.
- Safe methods of lifting heavy goods.
- Patient's general condition and strength.
- Backache schools.
- Doctor's education.
- Ergonomic work designs
- Material management.
- Posture correction.
- Workspace design.
- Body vibration.
- Worker's selection
- Prior medical examination.
- Job performance related programs.

Others[35,36]

- Programs to quit anti social habits.
- Programs to avoid and counter Obesity.
- Programs to avoid a sedentary lifestyle.
- Programs for teaching the art of living.

CONCLUSION

Mechanical low back pain prevention requires effective knowledge of the best working conditions and to modify them according to the need of a person. It is a necessity to teach people the correct and efficient way to carry out Activities of daily living. The use of back supports and shoe modifications or use of other biomedical supports for different body parts should be considered as an effective preventive measure. The preference of different schools of mobilization among the physical therapists remains varied but the schools of thought of mobilizations of choice seem to be Maitland and McKenzie.

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