

# **Insistent functional restoration for treating back pain: the logical alternative for spinal pathology therapy.**

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## **Objective**

**Convey four years of objective data obtained by the functional testing and restoration of spinal pathology patients in an Australian clinic. In order to test spinal function, prescribe treatment and evaluate results, MXS Australia has developed an educated system of proven care, called SpineX SpineCare. This system utilises special computerised medically based therapy machines, MedX.**

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Problems associated with back pain, in particular the lumbar and cervical regions, are some of the most frequently presented conditions in Australian medical and general practices. It is estimated this accounts for the third most common complaint that is seen<sup>(1)</sup> and in 2010-2011, there were 93564 hospitalisations with back problems<sup>(2)</sup>. The expenditure for treating these problems in Australia is over \$9 billion per annum, while \$1.02 billion is spent on direct costs such as physiotherapy and chiropractic<sup>(3)</sup>, and these costs are continuing to rise.

Though these figures rise, little is being represented in terms of patient relief and pain reduction. Adding to these costs is the consequences it has on the Australian workforce, as employees lose time spent at work or have to reduce the tasks that they can perform, affecting productivity, employer labour costs and workers compensation expenses. WorkCover Queensland <sup>(4)</sup> numbers show that injuries to the back consistently comprises the majority of payments made by compensation bodies each year, and has not varied over the last 10-15 years.

Conventional methods of spinal rehabilitation and therapy have mixed and/or limited results, and due to the passive nature of these treatments little is achieved in restoring functional strength and therefore, spinal health. As reduced function due to back pain continues, a deconditioning effect is seen which initiates a 'decaying' process that creates a state of frailty. This frailty should obviously be treated as early as possible, and the treatment must provide a stimulus that enhances the physical environment of the spine. Published data has shown that aggressive spinal strengthening can dramatically reduce the need for risky and expensive spinal surgeries, and assist in helping sufferers restore and maintain function while relieving pain <sup>(5)</sup>. By improving the supporting structures/musculature and the condition of the spine, progression into greater problems and complications can be minimised while functional capacity increases.

The National Health and Medical Research Council (2003)<sup>(6)</sup> states that 95% of back pain is non-specific and over 90% of radiological examinations show normal or minor changes to the condition of the spine. Back surgery has a suspect history of success. The Medical Journal of Australia (Jan 2004)<sup>(7)</sup> reports, no more than 50% of back surgeries are successful. Furthermore, the American Physical Therapy Association<sup>(8)</sup> claims that approximately 20% of spinal surgery patients will have

another operation within 10 years. The actual cost per spinal surgery is difficult to obtain, and this is mainly due to the many variables that are considered per person such as severity of condition, length of stay in hospital, time lost at work, and initial therapies initiated at the hospital recovery.

These figures indicate that in many cases spinal surgeries are unacceptable. Such treatment carries a substantial risk and danger for the vast majority of back pain sufferers who can experience relief with an advanced alternative to standard therapy procedures. Studies demonstrate that the need for back surgery can be avoided through targeted, specific and early exercise therapy, showing that the severity of back pain can decrease by 10-50% through adequate physical activity alone. Long term results show the recurrence of lower back injuries within three years in trained patient's drops from 84% to 30%(9). As over 71% of the previously mentioned \$1 billion spent on back pain is on recurring treatments, this highlights the high expense that Australia invests into treating spinal pathologies(10), with wanting return in patient improvement. Evaluation of the efficacy of passive therapies has shown there is little lasting effect on the reduction of chronic back pain, while helping in the acute phases of injury/pain but does little to prevent muscular atrophy, degeneration and stiffness(11).

The exercise that is usually prescribed for general muscular conditioning is not appropriate in this situation, as they:

1. leave the patient vulnerable to dangerous forces such as gravity- bearing and frictional
2. are unable to specifically target the area, actually further aggravating the injuries that have been sustained(12).

Functional therapy using appropriate equipment is required to allow for isolation of the lumbar and cervical structures of the spine, so these areas can experience conditioning gains that are neglected in a generic rehabilitation program. With regards to the lumbar spine, meaningful exercise/ functional therapy can only be achieved by preventing pelvic movement, ensuring that the lumbar muscles are forced to safely perform repetitions under an applied resistance with eliminated external forces that could otherwise present harmful shifts throughout the patient's full range of motion(13). This concept is also applied while conducting cervical therapy, as the neck is isolated to prevent the shoulders or other areas from shifting on movement and eventually dominating the exercise.

Over the past four years, MXS Australia has conducted a clinical program using highly developed medically proven lumbar and cervical extension machines in conjunction with educated supervision with qualified medical and allied health professionals. During this time, over 1600 subjects performed an initial assessment, followed by treatment using established protocols, procedures and guidelines. Patients ranged from those with minor degenerative changes or chronic non-specific back pain, to those who were at risk of spinal surgery or had already undergone a procedure. The results will be discussed later.

## **Method**

As stated, MXS Australia has conducted a clinical program over the period, using these specialised lumbar extension and cervical extension machines, which are designed to accurately test, restore and evaluate spinal function. Both machines are capable of isolating the specific regions of the

anatomy that is to be targeted when treating back pain (chronic or acute) and have demonstrated safe and objective measurements of spinal strengthening results. Over 1600 patients (as of May 2013) performed an initial lumbar and/or cervical function test, which involved isolation of the specific muscles via proper restraints and were instructed to perform isometric tests of strength at various positions of their predetermined spinal range of motion (normal lumbar range 0-72°, normal cervical range 0-126°). The subsequent test results show a pattern, visually displayed on a computer that graphs strength (in units of torque output) versus range of motion (units of degrees), that will determine normal to impaired function. The severity of deconditioning or injury that the patient possesses will be shown in the results produced, such as limited range of motion or inconsistent or erratic strength. While this system allows for an accurate and objective measurement of function, it also identifies malingering and uncooperative subjects by professional supervision and instruction on how to perform the tests.

Data collected during testing prescribes a starting point for further therapy where patients are instructed to perform dynamic movement with a resistance (determined from the initial test) throughout their achievable range of motion. Movement was performed at a slow, controlled tempo, thus eliminating the use of momentum that could present potentially dangerous forces on an already compromised spine. Aside from safety, slow speed repetitions have been shown to develop greater strength gains<sup>(14)</sup> than faster movements. While care was taken in instructing the patient to exercise safely, patients were encouraged to work as intensely as possible, performing enough repetitions to elicit momentary muscle failure. The effort that the subject puts in will contribute to the success of their session more than any other factor, as this will promote greater strength and functional enhancement gains than just performing exercise in a careless and unmotivated manner.

Although the greatest of care was taken and all sessions supervised, patients were reminded that as a part of functional restoration program, there may be some occasional discomfort during and after sessions. Over time, this will subside and optimally total workload will increase per session, in the form of resistance applied, increased range of motion, greater time under muscle tension and even better technique. Once performance is at an appreciable level, the greater the function and condition of the spine and the lower reported pain levels will be.

## Results

The clinical program involved 1730 patients/clients over the four years, and with generally only **five** sessions of therapy, tested patient's objective results show (as of May 2013):

- An average composite improvement in functional strength output of 88.6%
- An average increase in spinal flexion/extension range of motion of 17.1%

The results of functional output were measured by the hospital-grade computers summing the amount of force applied by the patient at the tested points and the percentage change in range of motion achieved (Composite Strength Index or CSI). The change in range of motion was only considered in those patients that had impaired range upon initial testing (that is, <72° or <126°).

The statistics show the results of the patients that completed the lumbar functional program are:

- An average composite improvement in functional strength output of 92%
- An average increase in spinal flexion/extension range of motion of 17%

The statistics show the results of the patients that completed the cervical functional program are:

- An average composite improvement in functional strength output of 49.4%
- An average increase in spinal flexion/extension range of motion of 17.5%

Due to the significant number of lumbar tests performed compared to the cervical tests, a weighted average is calculated for the total improvements.

All patients performed an initial test and an average percentage result was calculated from a produced finalisation test. The study was conducted primarily to test, restore and evaluate spinal function and not for spinal surgery prevention. The number of patients who have avoided surgery is inconclusive; however, patients identified have shown outcomes consistent with the 91% that have avoided surgery stated in previous studies<sup>(15)</sup>. In addition, patients who have been prescribed for further on-going treatment have shown significant continued improvement.

## **Discussion**

The goal was to provide an alternative to spinal surgeries and other less effective treatments, to provide Australians with a system that improves spinal function and reduces the complications of back and neck pain. The results that MXS Australia has achieved in this time are statistically similar to other studies utilising the same specialised equipment highlighting the benefits of such aggressive functional therapy programs performed in other countries. This treatment delivers a cost-effective and measurable method of improving spine function while reducing or eliminating back pain.

The use of this system, with its specialised equipment, as an alternative to contemporary therapy is a beneficial and safe form of targeted exercise that shows superior improvement in patient back strength and flexibility with only one session per week <sup>(16)</sup>. Studies have shown that an aggressive (relative to the person) therapy program commenced earlier post-injury or operation results in greater functional returns and decreased pain than no treatment or even passive treatments, along with no evidence of re-aggravation requiring a second procedure <sup>(17)</sup>.

There is peer reviewed literature that suggests that muscular pain can be directly related or even caused by muscular weakness <sup>(18)</sup> and this is no different for the conditions affecting the spine. Incorporating the use of equipment designed to isolate and strengthen the muscles of the spine should be applied as a safe, meaningful form of therapy, as this will produce results that are impossible to replicate through the subjective non-isolating nature of other alternatives for therapy.

These studies show that improved functional capability of the spine will allow for better management of spinal pain, and improvement in the patient's ability to perform greater tasks either domestically or in the workplace <sup>(19)</sup>. Such an example is the Western Energy Mine study by Mooney (1995) <sup>(20)</sup>, which used a similar method of prescribed treatment as the MXS Australia system; this showed a decreased likelihood of injury in the workplace with a decline in injuries per 200000 employee hours along with a decrease in monthly worker's compensation costs (\$14430 vs \$380).

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