Broad introductory information

Getting more specific

Critical analysis

Leading towards aim

**1.0 Introduction**

Low back pain (LBP) occurs in 40-85% of people at some point in their lives.[1](#_ENREF_1),[2](#_ENREF_2) Even with the variation of prevalence in epidemiological studies, LBP remains the leading cause of reduced function and years lived with disability worldwide.[3](#_ENREF_3),[4](#_ENREF_4) In 2001, direct and indirect costs of LBP in Australia were $9.17 billion.[5](#_ENREF_5) Furthermore, musculoskeletal conditions were the fourth leading cause of direct healthcare expenditure in Australia, with 21% of these costs associated with LBP.[6](#_ENREF_6) The majority of LBP resolves in less than two weeks,[7](#_ENREF_7) and 60-90% of individuals recover within 12 weeks.[2](#_ENREF_2),[8](#_ENREF_8) Persistent LBP beyond 12 weeks is defined as chronic LBP (CLBP)[9](#_ENREF_9),[10](#_ENREF_10) and currently affects 16% of the Australian population.[11](#_ENREF_11)

The management of CLBP is complicated by biological, psychological, social and comorbid factors.[12](#_ENREF_12) Surgery, manual therapy, electrotherapeutic modalities, acupuncture and exercise training have shown some success for reducing pain intensity.[9](#_ENREF_9),[13-16](#_ENREF_13) Conservative management is as effective as surgery for reducing pain intensity in individuals with CLBP, yet is more cost effective and has a lower risk of complications.[13](#_ENREF_13) Common conservative approaches include exercise training[14](#_ENREF_14),[15](#_ENREF_15),[17](#_ENREF_17) and spinal manipulative therapy,[16](#_ENREF_16),[18](#_ENREF_18) however, there is currently no evidence supporting the use of either approach over the other for managing pain intensity. Individuals with CLBP also demonstrate reduced physical function, general deconditioning, social isolation and psychological distress.[19-21](#_ENREF_19) Comparatively, there is less evidence available on the effectiveness of these treatments for other outcomes of clinical importance (e.g. muscular endurance, muscular strength and disability) in CLBP.[22](#_ENREF_22) Therefore, the aim of this review is to discuss CLBP, common conservative treatments and the efficacy of these approaches on pain intensity and other important clinical outcomes.

**2.4.2 Spinal Manipulative Therapy**

Spinal manipulative therapy (also known as manual therapy) is practiced by multiple health care professions, including chiropractors and physiotherapists.[16](#_ENREF_16) Spinal manipulative therapy is a passive hands-on treatment which applies mobilisations and manipulations to structures of and surrounding the spine.[68](#_ENREF_68) Mobilisations are considered a low velocity technique using gentle joint and muscular stretching to improve mobility,[68](#_ENREF_68),[69](#_ENREF_69) while manipulations use high velocity thrusts to move spinal joints beyond restricted ranges.[68](#_ENREF_68),[69](#_ENREF_69)

A meta-analysis showed that spinal manipulative therapy is no more effective than other interventions, including exercise training, for CLBP in short- (≤6 weeks) and long-term (≥6 weeks) settings.[18](#_ENREF_18) However, a Cochrane review showed that spinal manipulative therapy added to an exercise training intervention, such as stretching, had significant short-term (3-month) benefits for reducing pain intensity (mean difference, -7.2/100mm).[16](#_ENREF_16) Whilst this relationship is poorly understood, it is possible that this association is due to a placebo effect as spinal manipulative therapy is no more effective than sham spinal manipulative therapy.[16](#_ENREF_16)

As CLBP is a condition lasting greater than 12 weeks, spinal manipulative therapy may need to be completed in conjunction with a long-term intervention to maximise results.[9](#_ENREF_9) For example, motor control exercise plus manual therapy (MCMT) is commonly used in conjunction to treat CLBP in clinical practice,[70](#_ENREF_70) with both motor control exercise and spinal manipulation effective in reducing pain intensity.[14](#_ENREF_14),[16](#_ENREF_16) Therefore, it is important to assess the benefits of MCMT on physical and psychosocial outcomes to determine the best long-term treatment for CLBP.[70](#_ENREF_70)

**2.5.5 Self-Reported Kinesiophobia**

Kinesiophobia is defined as the fear of movement[133](#_ENREF_133) and interferes with the ability to complete ADLs in individuals with CLBP.[134](#_ENREF_134) Notably, disability has a greater correlation with kinesiophobia (r=0.56) than pain intensity (r=0.21).[135](#_ENREF_135) Therefore, assessing kinesiophobia during treatment of CLBP is important to reduce fear and disability, subsequently maximising the participation in normal activities.[134](#_ENREF_134) RCTs of motor control exercise,[136-138](#_ENREF_136) graded activity[137](#_ENREF_137) and multidisciplinary programs (MCMT plus cognitive behavioural therapy)[139](#_ENREF_139) have improved kinesiophobia in CLBP, while others using motor control exercise[140](#_ENREF_140) and resistance training[86](#_ENREF_86) have shown no change. A limitation of the previous resistance training study was the focus on machine weights, which are completed in a supported position, and therefore do not expose individuals to movements associated with daily tasks.[86](#_ENREF_86) This is important as individuals with CLBP fear movements such as lifting, bending and carrying objects, which cannot easily be replicated with machine exercises.[47](#_ENREF_47) To target kinesiophobia, exercise training may need to include graded exposure to activities that are feared by people with CLBP.[141](#_ENREF_141) GSC may be able to reduce kinesiophobia by guiding individuals through movements they fear (e.g. picking up an object) when compared to other interventions, such as motor control exercise.[71](#_ENREF_71) Therefore, GSC may be superior in reducing kinesiophobia when compared to MCMT.