

Exercises and Management of Lower Back Pain

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Introduction

The role of exercise and activity in the management of back pain has changed markedly over the last century. The emphasis moving from resting patient's 'allowing tissues to heal', towards encouraging movement and activity as early as possible. This has been mirrored by a shift from so called passive treatments which were done to a patient (e.g. ultrasound and traction) to active ones where the patient is encouraged to play a role in their own recovery [1].

Rehabilitation is a popular treatment option increasingly utilised by all major professions involved with musculoskeletal injury. Yet the evidence base for its effectiveness remains weak; meta-analysis for the Cochrane collaboration concluding only that exercise therapy appears to be slightly effective at decreasing pain and improving function in adults with chronic low-back pain, but that in acute low-back pain exercise therapy is no more effective than no treatment [2].

Tantalisingly, two large scale randomised control trials (RCT) appear to show convincingly that exercise as part of a package with other therapy provided superior and longer lasting benefits to either therapy alone [3, 4]. In both cases the combination was significantly better than 'best practice' GP care. The UK BEAM trial combined exercise with manipulation, and the ATEAM study com-

bined it with Alexander Technique (AT). These looked at chronic non-specific back pain (CLPB) patients and followed them up for a year. The studies found that whilst manipulation and a short course of AT both were helpful to the patient's, this benefit was limited at one year follow up. When combined with exercise however they produced greater benefit and this was still significant a year later.

Types of exercise

There is little consensus as to what form rehabilitation should take, with some authors suggesting that any programme which significantly works the involved body region is effective [5-8], whilst others recommend exercises specifically targeted at functional losses identified in individual patient's [2, 9]. Therapeutic exercises done largely on the basis of changes to symptoms (centralisation phenomena) are advocated by Robert McKenzie and appear to produce positive outcomes [10]. Back pain patient's given exercises that improve cardiovascular performance, generally describe reductions in pain and disability even in the absence of any back specific tasks [8, 11]. Few papers have been published directly comparing general whole body exercises to back specific programmes, but those that exist indicate little difference between them [6, 7]. In 2005 Hayden et al performed a meta-analysis looking at exercise intervention types and their effects on pain and disability, concluding 'Exercise therapy that consists of individually designed programmes, including stretch-

ing or strengthening, and is delivered with supervision may improve pain and function in chronic non-specific low back pain' [2].

Current European guidelines on management of chronic lower back pain recommend the use of supervised exercise programmes whilst the US guidelines recommend 'interdisciplinary rehabilitation', yoga and exercise prescription [12, 13]. However they both expressed weak confidence with the statements regarding these. Draft NICE (UK) guidelines for chronic non-specific LBP echo the advice on using patient specific exercise provided in a supervised format [14].

Supervision is understood to be important if exercises are to be therapeutically effective for the treatment of back pain (as opposed to their use preventatively) [14, 15]. This is because exercises are only effective if they are actually done and are most effective if they are done correctly, neither of which are likely if a patient is left to their own devices. Additionally for many programmes there will be a change in type, difficulty, intensity or duration of prescribed activity as the programme progresses, which will not be possible without some expert guidance.

The types of exercises examined in the BEAM and ATEAM studies were very different: BEAM using eight one hour group sessions, with a refresher after three months, supervised by physiotherapists and delivered using cognitive behavioural principles. ATEAM's consisted of advice from a doctor to take exercise using an exercise prescription,

usually of daily walking. Both produced similar changes in disability at three months, as measured by the Rowland Morris questionnaire (RM), but the supervised programme had less benefit at one year. This is interesting because it is at odds with current guidelines, and although one paper is unlikely to radically change opinion the quality of this paper may start to influence it.

Targeting exercises

The specific aims of exercise, beyond reducing pain and disability, does not appear to be well addressed in the research to date. Before the mid 1990's the thrust of rehabilitation was to identify weak or shortened muscles and address these with specific stretch or strength work. This has evolved through assessing functional patterns about individual joints to now where it is considered by many, best practice to look for and address alterations in patterns of motor control during 'real world' activity [16, 17].

Despite the relatively weak evidence for the effectiveness of exercise on outcomes there is much stronger evidence for objectively measurable functional changes within groups of CLBP patients when compared with pain free populations [18-20]. This includes changes in strategies for activities such as balance and walking, impaired proprioceptive effectiveness through reduced joint position sense and reduced ability to detect movement [21, 22]. There are also generalised disturbance of higher level information co-ordination in the motor control systems [23].

It is altered firing patterns between the erector spinae, transverse and oblique abdominal and gluteal muscles and the endurance of the deeper fibres of the erector spinae that have been most strongly correlated with back pain [11, 20, 24, 25]. So these would appear appropriate targets for exercise based treatments, and in populations with CLBP where these changes have been identified, their normalisation correlates with reduction of pain and disability. However it is not known if this is a cause or effect. It is also not known if these altered patterns predate the onset of the pain or arise as a consequence of it [9]. Frustratingly the presence or absence of this altered function has not been found to be predictive of recovery, either in terms of residual disability or pain, so questions still exist as to its significance.

Within UK chiropractic, exercise programmes may be entirely bespoke, whereby exercises are used only to target functional loss within the individual. They may involve a core set of exercises which everyone on the programme follows but with additional activities prescribed by the patient's clinician, as happens in the outpatient clinic at Welsh Institute of Chiropractic [26]. A menu of predefined 'off the shelf' exercise programmes may exist, from which a clinician selects the one most suited to the patient. Each of these approaches and variations on them has advantages and disadvantages in terms of the time and amount of supervision necessary, balanced against individuals specific functional needs.

Limitations of the evidence

There are limitations in using RCT's to explore complex interventions as opposed to simple ones (e.g. pills A vrs B). Complications with the papers quoted here include:

Exercise is rarely given alone in clinical practice but forms part of a 'package of care', taking it out of this context may change its effects. Even where an attempt is made to assess the benefits of combining treatments researchers are still tempted to place limitations on how they are delivered and what else can be used alongside them, as happened in BEAM and ATEAM.

Issues exist as to what outcomes trials should be looking for, and how they are interpreted. The BEAM trial used RM as its main measure of outcome. When discussing their data they talk about having demonstrated significant results. It is broadly accepted that a change of 2.5 points indicates clinical significance for the RM [27, 28]. In BEAM the combination of manipulation plus exercise gave a change of 4.38 which is both clinically and statistically significant, but this was only 1.3 better than 'best practice GP care' - still statistically significant but no longer clinically so. This differentiation means the combined treatment made a genuine difference but possibly not enough for the patient to notice compared to 'usual care'.

There are questions with how representative, population selected can be in a prospective trial. BEAM identified 11929 potential recruits, but before these were tested for eligibility 4872 (41%) had

dropped out through non-response to postal questionnaire (3424) or failure to attend pre trial assessment (1448). There is an assumption made that those who dropped out, and who would have met entry criteria, were in other respects the same as those eventually recruited. However their failure to respond/attend may imply psycho-social factors differentiating them from those who did. If so this could be meaningful as psycho-social factors are amongst the strongest predictors of response to care [29]. This is not the fault of the trial team and will forever be a weakness of a prospective trial of this type, indeed the AT trial had 88% who failed to reply to an invitation to participate (18342 invites sent 4803 responses). An answer may have been to approach a sample of this group and see if they would be willing to be tested against the exclusion criteria, and then complete the initial baseline assessments, thus proving their similarity or otherwise to the trial population.

Problems in interpretation can be compounded when RCT's are merged in a meta-analysis. For her well regarded review Hayden's team assessed 43 trials and because of the range of outcome tools used they amalgamated the results onto a 0-100 point scale [30]. This revealed mean improvements of 7.5 points for pain and 2.5 for function attributable to exercise. The outcome data included was from the earliest follow-up in the underpinning texts whenever these were recorded. Thus she had a homogenised outcome set taken over an undefined range of times.

Using RCT's in this way may give an over-view but it can be argued that it is of limited help to the clinician. From Hayden's results we do know that there will be a fall on average of 7.5 points in pain if treated with exercises. We do not know how likely it is for any individual to have benefit. When reviewing the outcomes of my clinical practice for publication I found that, when asked three months after treatment, 74% of patient's presenting with CLBP described themselves as having had 'real and worthwhile improvement that had made all the difference' and 9% for whom there had been no benefit [31]. This would appear to support the contention, that when looking at populations of back pain patient's response to treatment, whilst some individuals get good benefit, others are not helped. Thus the mean results can look less substantive. For individual outcome measures it is possible to define clinical significance in their results, but this is not possible where meta-analysis have combined results from disparate outcome tools [32]. In the real lives of patients what does 7.5 percent improvement mean? Given the costs of time and finance, would patients choose to start an often prolonged course of rehabilitation for this reduction in their symptoms? Would they describe it as a successful outcome of care?

Distillation of evidence largely from meta-analysis or RCT's into guidelines can potentially further compound the aforementioned problems. The finalised NICE guidelines are likely to be widely look to when deciding how, when, or if

exercise is be used [14]. They reviewed 1195 papers, rejecting most as not of suitable quality to meet their criteria or because of the multiple inclusion of RCT's across meta-analyses. The conclusions reached were based upon seven papers (Hayden's review, four RCT's on exercise published subsequently, one on yoga and one on hydrotherapy.) Interestingly the set up for this study enabled them to, if they chose, look beyond the constraints of the limited 'high quality' papers identified against their criteria, and take a slightly more pragmatic view. This would have permitted them to reach conclusions not entirely supported by RCT evidence but rather a distillation of case studies, other published work and consensus of the assessment team. Although this mechanism was in place it was not used when reviewing the role of exercise, only when they came to examine the possible side effects of manipulation.

Discussion

Patient's attitude and beliefs about their back problem are predictive of their eventual outcome [33]. It is possible that this is because these psychological factors determine their activities - for example fear that activity may cause more harm making individuals resistant to movement. Extrapolating this, one benefit of exercise may be to prove to the patient how much they are able to do thus defusing inappropriate concerns [34]. To this extent rehabilitation may be having similar effects to cognitive behavioural therapy, which also has a weak yet growing pool of papers showing some benefit for CLBP [35]. It may

also help explain why non back specific exercise protocols have similar success in outcomes to more targeted ones.

What appears to be a fundamental question that is as yet unanswered in the literature is; for whom and when is rehabilitation best used within the overall framework of managing a patient's LBP? Should it be instead of, alongside, or after the failure of other treatment options? As previously mentioned there is evidence that it is more powerful if used alongside other care, but this brings cost and resource implications. As exercise on its own, like manipulation, has been shown to be a cost effective management option would it not be appropriate to use it in isolation [36]? Yet for individuals who fail to respond to one care package, the cost both economic and through pain and disability will obviously be greater if they have sequential 'trials of treatment' down different routes. Additionally there is the suggestion that failed treatment has adverse psychological effects making LBP increasingly treatment resistant [37]. It is likely that the answer will depend on how the exercises are to be delivered and possibly different subgroups of back pain patient's will benefit from different approaches, but more work is needed in this area.

I found no papers that had looked to see if exercises influenced speed of recovery. As patients will not only be interested in how much better they get but also how protracted and easy the path to recovery is, it would be interesting to see this included as an outcome of care in future studies,

Summery

In light of all of the above, incorporating functional management into clinical chiropractic practice in an evidence based (EBP) way and not doing it just because it is fashionable at the moment is interesting.

EBP is a fusion of the body of published information, clinicians experience and patient's preference. Given the apparently conflicting messages from the evidence, there is great scope for experience and preference to be taken into account. In addition the resources available to the clinician will have to influence their choice of approach.

There is little suggestion that back specific rehabilitation in any form improved the outcomes for patient's presenting with first episodes of acute back pain [15, 30]. Thus spending resources (time or money) on pursuing this would have to be questioned. However there is limited evidence that recommending general aerobic exercise provides some short term benefit, and as overall fitness has been shown to have benefits for back pain in addition to the other positive health advantages it brings, encouraging acute back pain patient's towards an active lifestyle is appropriate [11].

For patient's with enduring LBP it is likely that exercise brings benefit. Unless the patient is going to perform the tasks set they can have little value so selecting an approach that is acceptable to them will be important. Optimum physical function may be an attractive goal for clinician and patient alike, but in

the real world full of competition for time and attention, few can pursue this exhaustively. Identifying the main deficits within individuals with LBP be they functional, mechanical or psycho-social and addressing them through a combination of applied and directed modalities including often exercise, would appear the path that the majority of healthcare providers feel is most likely to provide resolution of discomfort and disability.

Although there have been very many studies looking at the role of exercise for low back pain, the problems in putting together meaningful trials given the number of variables, have produced a clutter of sometimes contradictory results. This has meant that guidelines drawn from meta-analysis are essentially vague. It is possible that if more consensus based analysis could be conducted, cutting through the homogenised and bland results of the traditional RCT by allowing consideration of other forms of evidence, as the Quebec Taskforce did for whiplash injury, then clinicians may have more meaningful guidance.

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