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To cite this article: Greg McIntosh, Tom Carter & Hamilton Hall (2015): Characteristics of constant and intermittent mechanical low back pain, European Journal of Physiotherapy, DOI: [10.3109/21679169.2015.1119192](https://doi.org/10.3109/21679169.2015.1119192)

To link to this article: <http://dx.doi.org/10.3109/21679169.2015.1119192>



Published online: 22 Dec 2015.



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ORIGINAL ARTICLE

Characteristics of constant and intermittent mechanical low back pain

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ABSTRACT

The objective was to compare characteristics of patients with mechanical constant versus intermittent low back pain (LBP) as they progressed through non-operative treatment. A single-page clinician-administered questionnaire was utilised in a consecutive sample of 62 LBP patients during their initial assessment, then readministered weekly until treatment was concluded or pain abolished. At initial assessment, 45% had constant pain ($n = 28$), 55% had intermittent pain ($n = 34$). For those who had intermittent pain at assessment, no one regressed to constant pain by the conclusion of treatment. For those presenting with constant pain, 18% remained constant while 82% improved; 43% progressed to intermittent pain and 39% achieved pain abolition. For the 42 respondents who specified a reason for their change in pain presence, 76% stated that their pain decrease was due to a positive response to exercise, while 17% blamed exercising for a flare-up. Only 7% said that the change was related to a difference in medication. In the constant pain group, 87% had a positive response to exercise, 4% blamed exercising for a flare-up and 9% believed the alteration was due to a change in medication. Back pain usually runs a protracted relapsing course. This study provides data on characteristics and progression of constant and intermittent back pain throughout a course of non-operative treatment.

ARTICLE HISTORY

Received 8 July 2015
Accepted 7 November 2015
Published online
22 December 2015

KEYWORDS

Assessment; characteristics;
flare-up; non-operative;
questionnaire

Introduction

Determining whether a patient has constant or intermittent low back pain (LBP) during an initial assessment is important because with constant LBP, there is always the possibility of a more sinister pathology, whereas intermittent pain rules out several serious conditions such as a spinal metastasis and directs clinicians towards a benign, mechanical cause.[1] But the spine literature contains only a few studies that focus on the clinical significance of intermittent versus constant mechanical LBP. The prevalence of intermittent LBP ranges from 33% to 65%.[2–5] In studies of specific populations, intermittent pain occurs frequently; in ≥ 70 -year-old Danish twins, Hartvigsen et al. [6] concluded that intermittent back pain and neck pain are common symptoms. Nowotny et al. [7] investigated three distinct and apparently unrelated adult groups for spinal pain: those with a childhood history of scoliosis, midwives and physiotherapists. The authors discovered that over 80% of subjects in all three cohorts suffered from spinal pain, and in most cases, the pain was intermittent and occurred in the low back. Large and Strong [8] explored the concept of coping and found that patients categorised as ‘copers’ typically had intermittent, not

constant, pain. Kosashvili et al. [9] studied the relationship between flat feet and intermittent LBP in adolescents; the prevalence of intermittent LBP was 5% in both the control and the mild pes planus groups, while the prevalence was significantly higher (10%) in those with moderate and severe foot deformity.

Two studies have demonstrated that intermittent LBP may have predictive value. In the first paper, Smart et al. [10] identified a cluster of seven clinical criteria predictive of ‘nociceptive pain’, defined by the authors as ‘usually intermittent and sharp with movement/mechanical provocation’. In the second study, McIntosh et al. [11] found that intermittent LBP was one of three factors associated with reduced disability; those with intermittent LBP spent significantly less time collecting workers’ compensation benefits than those with constant pain.

Three studies have targeted specific cohorts of intermittent LBP sufferers. Walker and Williamson’s analysis revealed that intermittent pain during the day and pain that develops later in the day were two of 12 indicators of mechanical LBP.[12] In a study that compared patients with intermittent LBP during a pain-free phase against an age- and gender-matched symptom-free control group, Rasmussen et al. [13] did not find any statistically significant differences in pain

perception between groups; the authors concluded that patients with intermittent LBP do not seem to have a heightened pain awareness between attacks. Colloca and Keller [14] demonstrated that the spinous process stiffness index was significantly higher in those with constant LBP than in those reporting intermittent or no LBP; subjects with constant LBP symptoms also reported significantly greater visual analogue scale ratings and Oswestry scores, and poorer perceived health status compared to those with intermittent LBP.

Recognizing clear syndromes and initiating corresponding treatment has been shown to improve outcomes for pain relief, medication use, function and length of treatment.[15] Distinguishing between constant and intermittent pain status is an important part of obtaining a complete LBP history; effective syndrome recognition is dependent on the distinction between constant and intermittent pain. The purpose of this study was to compare characteristics of those with constant versus those with intermittent LBP as they progressed from intake to discharge in non-operative treatment.

Materials and methods

A single-page survey was administered to patients at 11 spinal care physiotherapy clinics, across four Canadian provinces, between February and April 2010; 62 consecutive adult patients with LBP agreed to participate upon completion of informed written consent; participants were not given any incentives or reimbursements or compensation for involvement in the study. The intake was sequential and was not influenced by the mechanism or speed of onset, existing comorbidities or the clinical characteristics of the pain. Patients were excluded if there was a history or suspicion of a spinal infection, spinal malignancy, significant trauma or underlying medical condition as a cause of the pain, neurogenic claudication or a history of spinal surgery.

All patients were diagnosed with mechanical LBP and were classified by the treating physiotherapist according to the Saskatchewan Spine Pathway triage methodology.[16] The high intertester reliability of this assessment method has been previously documented.[17] The term mechanical precludes identifiable red flags (tumours, infection or fracture) and is defined as benign pain arising from a physical structure or structures within the spine. Mechanical LBP is pain that varies or fluctuates with movement and/or position.[1,15,18]

Physiotherapy assessment was based on the recognition of four syndromes or patterns of pain with no direct reference to anatomical site or pathological process. In this system of subclassifying LBP, the essential elements

of the syndromes are determined by: the location of the dominant pain, constant or intermittent pain status, and specific movements or postures that exacerbate or alleviate symptoms. This method purposely avoids the label 'non-specific'. The system is intended to describe all possible presentations of mechanical LBP with or without associated direct nerve root involvement. The assessment was strongly linked to the subsequent management strategy.

Treatment is active, exercise-based physiotherapy and commences after identification of the clinical syndrome.[16,19] The treatment is based on three sequential stages of recovery: stage 1, pain control; stage 2, recovery of movement; and stage 3, physical conditioning. Each stage is individualised to the specific patient. In stage 1, the goal is to decrease symptoms or abolish the pain if possible through exercise related to patients' specific directional preference (flexion or extension) [20], manual therapy and education. In stage 2, the objective is to help patients to recover or perform some of the movements they were not able to do while in pain, in order to regain as much range of motion as possible. Strength, endurance and aerobic training are also components of stage 2. Stage 3 involves physical conditioning based on current fitness levels and job demands. The underlying philosophy of all three stages is to transfer responsibility to patients so that they can help to control their own pain and take a conscientious role in their own recovery. Within the clinic, the number of treatment hours per day and the total duration of treatment are adapted to the needs of each patient.

Questions of pain status and treatment response are always documented within patient charts using the subjective, objective, assessment, plan (SOAP) method; this format can make abstracting data for study purposes laborious; thus, Appendix A contains a copy of the survey developed for this study; it is a clinician-administered questionnaire that captures the relevant enquiries about the current episode of LBP on one easy-to-abstract form. This instrument formalises what the clinicians ask of their patients on a daily or weekly basis. The questionnaire was pilot tested among five senior clinicians and four patients for content validity. All nine people completed Likert rating scales designed to assess validity. High agreement from the pilot suggested that the instrument had acceptable content validity.

Patients were queried during their initial assessment; the process was repeated weekly until treatment was concluded or pain abolished, whichever came first. The survey focused on whether the pain experience was constant, intermittent or had changed from one to the other. If there were a change in either direction, patients

were asked to speculate on the possible reason(s) from the following choices: positive response to exercise, negative response (flare-up), alteration in medication, or unknown. A choice of 'other' was purposely omitted since such a vague category usually fails to provide any differentiating information; the goal was to help patients to be more decisive in their responses. Since the questionnaire represents information consistently asked of patients as part of their treatment regimen, but in a more standardised format, ethics approval beyond informed consent was not obtained.

Statistical analysis was performed using SPSS version 20 (Chicago, IL, USA, 2012). Significant differences between groups were identified with the independent samples *t* test for discrete variables, chi-squared (χ^2) test for two-by-two categorical tables and Fisher's exact test for greater than two-by-two categorical tables. An alpha level of ≤ 0.05 denoted statistical significance.

Results

The mean age of all respondents was 41.03 years (SD 14.5, range 19–75 years), with 52% males. At initial assessment, 45% of the sample had constant pain ($n = 28$) and 55% had intermittent pain ($n = 34$). The independent samples *t* test revealed no statistically significant difference in age between groups (constant: 43.1 years, SD 15.7 years; intermittent: 39.5 years, SD 13.6 years; $t = 0.951$, $df = 58$, $p < 0.346$). Chi-squared analysis for categorical variables showed no statistically significant difference in gender between groups (constant: 39% female; intermittent: 52% female; $\chi^2 = 1.24$, $p < 0.265$).

Chi-squared analysis revealed that there was no statistically significant difference in the percentage who abolished their pain during treatment between groups (constant: 39% with pain abolition; intermittent: 41%; $\chi^2 = 0.023$, $p < 0.88$).

For those who had intermittent pain at initial assessment, no one regressed to constant pain by the conclusion of treatment; 41% reported abolition of pain while 59% remained intermittent. For those presenting with constant pain at assessment, 18% remained constant while 82% improved, with 43% progressing to intermittent pain and 39% achieving complete pain abolition.

For the 42 respondents who specified a reason for a change in pain presence, 85% stated that a decrease in the presence of pain was due to a positive response to exercise, while 10% blamed exercise for their flare-up. Only 5% said that the change in pain was related to a difference in medication. Figure 1 illustrates the reasons for change in pain presence by group. Fisher's exact test revealed no statistically significant difference between

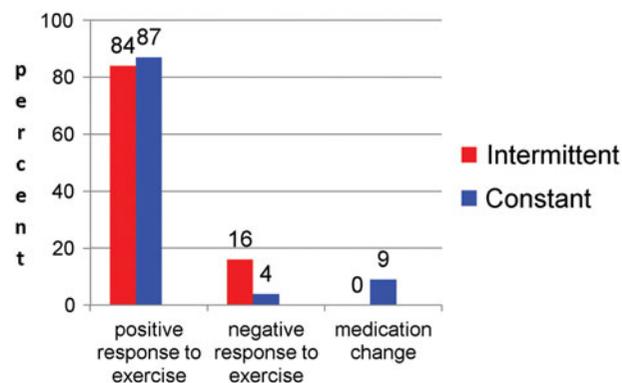


Figure 1. Reasons for change of pain status (%), for those with intermittent vs. constant pain at assessment.

groups in the reason for change in pain presence (Fisher's exact test = 2.64, $p < 0.279$).

The independent samples *t* test revealed that there was no statistically significant difference in the mean number of treatment days between groups (constant: 7.6 sessions; intermittent: 8.2 sessions; $t = -0.438$, $df = 60$, $p < 0.663$). There was a difference in the calendar days over which treatment occurred; the constant pain group had treatment over a significantly shorter period (constant: 21.7 calendar days; intermittent: 29.8 calendar days; $t = -2.08$, $df = 60$, $p < 0.042$).

Discussion

As previously stated, the prevalence of intermittent LBP ranges from 33% to 65% [2–5]; at 55%, the current study falls within the high end of that range. The results of this study, in combination with others studying the episodic course of LBP, provide a more complete picture of the long-term course.[19]

Many illnesses run a fluctuating episodic course. Some, such as diabetes, chronic obstructive pulmonary disease and multiple sclerosis, are generally viewed as chronic conditions.[21] Others that follow a similarly inconsistent course – such as depression, headache and LBP – are considered recurring acute conditions that only occasionally become chronic.[22] The classification may be difficult and imprecise but the fact is that human illness is characterised by variability and change – variability that is both important and difficult to study.[23] In the case of LBP, a better characterization of its episodic course may advance our understanding of the pathophysiological and psychosocial factors related to the production of pain. This, in turn, would positively influence the delivery of effective management and disability prevention.

LBP has characteristics of both an acute and a chronic condition. It is common for an acute episode of LBP to

improve substantially in a matter of days, with a rapid resolution of the intense constant pain, but then to follow a prolonged course of further improvement over 1–2 months. The actual picture is not one of prompt recovery but rather one of extended periods of back pain, either intermittent or constant, at varying levels of severity.[15] In the current study, 40.3% of all respondents abolished their pain by the end of treatment regardless of the initial (constant or intermittent) presentation. The recognition of back pain as a generally benign and self-limiting condition, albeit one with a frequently recurrent and protracted course, conforms to the view that LBP is an episodic phenomenon.[24,25] In this context, the arbitrary labelling of LBP as acute, subacute or chronic seems inappropriate and adds little clinical value. The episodic nature of LBP is both common and complex but identifying useful markers of its course and measurements of the final outcome, while challenging, is essential.

The results of this study provide useful information regarding the progress of constant and intermittent pain. The study found that 82.1% of the constant LBP group transitioned to intermittent pain. This may illustrate that those living with chronic pain are not necessarily doomed to such a life. Patients with constant LBP required essentially the same amount of treatment as those with intermittent pain, suggesting that those with constant pain have the potential to recover at a similar rate; prolonged treatment may not be necessary. Determining the pain status at initial assessment and educating patients on possible pain changes and timing will be advantageous to both clinicians and patients.

The significantly shorter period of calendar time for the constant pain group's treatment probably reflects a philosophy of providing more structure and condensed treatment to chronic patients. Those with intermittent pain often need less guidance and can go for longer periods managing their own pain without clinician supervision.

Surprisingly, none of the LBP cases reverted from intermittent to constant pain; the progression, in spite of temporary flare-ups, was invariably from constant to intermittent pain to full abolition. In total, 87% of the constant group and 84% of the intermittent group credited the treatment (mechanical pain control manoeuvres, self-directed activity modification, pain-relieving strategies and directional preference exercises) with the improvement.

One obvious limitation of this study is the non-representative sample. It included only adults with LBP who attended outpatient rehabilitation clinics and these results may not be generalizable to a wider

population of back pain patients. Our study relied on a survey completed on the patient's first visit and this was not necessarily at the start of the back pain episode. But because patients completed the survey in a prospective manner as the episode progressed, the questionnaire did limit recall or reporting bias. The definitive picture of intermittent or constant LBP would be a population-based study tracking patients from the beginning of their first experience with LBP. Logistically, however, this would be an impossible study design.

Although major gaps remain in our understanding of the clinical progression of LBP, the results of this study – in combination with those of others on the natural history – are beginning to provide a more complete picture of the long-term course and episodic nature of LBP. The actual picture is not one of prompt recovery but rather one of extended periods of back pain, either intermittent or constant, at varying levels of severity. The recognition of a frequently recurrent and protracted course conforms to the view that even constant LBP can be an episodic phenomenon.

Acknowledgements

The authors thank the CBI Health Group clinics in the following locations for data collection: North Battleford, Ottawa (east), Regina, Quebec, Quebec (St Etienne), Saanich, Saskatoon (Erindale), Saskatoon (Laurier), Saskatoon (Preston), Surrey, Toronto (Danforth) and Westshore.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding information

The study received no financial support.

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