



Preliminary Clinical Application of the Muscle Compression Resistance Index (MCRI) Using the BFpress Device: A Physiotherapy Case Report

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Abstract

Background: Objective assessment of muscle resistance and muscle spasm in physiotherapy practice remains limited, as clinical evaluation is commonly based on subjective palpation [4, 8]. Compression-based measurement approaches may provide more objective clinical information.

Purpose: To present a preliminary clinical application of the Muscle Compression Resistance Index (MCRI) using the BFpress device in a patient with lumbar muscle spasm following trauma.

Case Description: A 16-year-old female patient presented to a physiotherapy clinic two weeks after a fall accident with a diagnosis of cervical sprain and lumbar muscle spasm. Four physiotherapy sessions were performed, one per week. Muscle resistance was assessed using the BFpress device at the L4–L5 level.

Results: Mean BFpress values increased from 20 kg at the first session to 25 kg at the second and third sessions, and to 32 kg at the fourth session, indicating progressive reduction in muscle resistance.

Conclusion: This preliminary case report suggests that the MCRI may serve as a simple and clinically applicable monitoring index for documenting changes in muscle resistance during physiotherapy interventions.

Keywords: Muscle Resistance; Muscle Spasm; Physiotherapy Assessment; Compression Measurement; Case Report

Introduction

Muscle spasm and increased muscle resistance are common clinical findings following spinal trauma and are frequently associated with pain, reduced range of motion, and functional limitations. In routine physiotherapy practice, assessment of muscle tone and resistance relies largely on manual palpation, a method known to be subjective and examiner-dependent [4, 8]. Previous studies have highlighted the limited reliability of palpation-based assessment techniques, particularly when used to monitor clinical change over time [4].

Objective and non-invasive methods for assessing muscle mechanical properties, such as pressure algometry and myotonometry, have been proposed to address these limitations [1–3, 7]. However, many of these tools are not routinely used in everyday clinical practice. The present case report introduces a preliminary clinical application of the Muscle Compression Resistance Index (MCRI), a compression-based index derived from measurements obtained using the BFpress device.

The BFpress Device

The BFpress is a handheld physiotherapy assessment device designed to quantify the amount of externally applied compression tolerated by soft tissues. The device incorporates a pressure sensor that records applied force in kilograms (kg). Compression is progressively applied perpendicular to the skin surface until mechanical resistance is encountered or patient discomfort is reported. Similar compression-based approaches have been used to assess soft tissue sensitivity and resistance in musculoskeletal conditions [1, 2]. In the present study, the BFpress device was used exclusively as a clinical assessment and monitoring tool.



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Definition of the Muscle Compression Resistance Index (MCRI)

The MCRI represents a numerical expression of passive muscle resistance to external compression. Based on preliminary clinical observations and informed by existing literature on muscle stiffness assessment [2, 3, 7], the following interpretation was applied:

≤25 kg: increased muscle resistance or protective muscle contraction.

≥35 kg: normal muscle condition.

Intermediate values: partial recovery.

Changes in muscle resistance were monitored longitudinally using repeated measurements.

Case Description

A 16-year-old female patient presented to the physiotherapy clinic two weeks after a fall accident. Medical diagnosis included cervical sprain and lumbar muscle spasm. No neurological deficits were identified. Muscle spasm following trauma is a common protective response and is often associated with altered neuromuscular behavior [6]. The patient underwent four physiotherapy sessions, one per week, as part of a standard rehabilitation program.

Measurement Procedure

Muscle resistance was assessed at the lumbar L4–L5 level using the BFpress device. During each session, two bilateral compressions were applied at the beginning of the session and one bilateral compression at the end. The mean value for each session was calculated and used for analysis. Repeated measurements were used to document clinical change over time, consistent with recommendations for monitoring musculoskeletal outcomes in physiotherapy [10].

Results

Mean BFpress measurements demonstrated a progressive increase across sessions. The average value at the first session was 20 kg, increasing to 25 kg during the second and third sessions, with no measurable change between these two sessions. At the fourth session, the mean value increased to 32 kg, indicating a notable reduction in muscle resistance. The absence of change during intermediate sessions may reflect delayed neuromuscular adaptation following injury [6].

Discussion

This preliminary case report demonstrates the potential clinical utility of the MCRI as a simple monitoring index for muscle resistance in physiotherapy practice. Objective assessment of muscle stiffness and resistance has been increasingly emphasized in the literature as a complement to subjective clinical examination [2, 3, 7]. The observed increase in compression tolerance over time suggests a reduction in protective muscle contraction and improved passive mechanical behavior.

Importantly, the MCRI is not proposed as a diagnostic index but as a clinical monitoring tool designed to support documentation of treatment-related changes. This aligns with contemporary recommendations for the use of quantitative outcome measures in physiotherapy practice [10].

Limitations

This report describes a single clinical case and does not include comparison with other assessment modalities. The psychometric properties, reliability, and normative values of the MCRI remain to be established through larger studies [7, 10]. Therefore, findings should be interpreted as exploratory.

Conclusion

The Muscle Compression Resistance Index (MCRI), assessed using the BFpress device, appears to be a simple and clinically applicable method for monitoring changes in muscle resistance during physiotherapy interventions. Further research involving larger patient samples is warranted to validate this approach.

Ethical Considerations

Written informed consent was obtained from the patient and her legal guardians for the anonymous use of clinical data for publication purposes.

Conflict of Interest

The author declares no conflict of interest.

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