

An Initial Evaluation of Body Protective Compound 157 (BPC-157) a peptide, as treatment for Musculoskeletal pain

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Abstract

Musculoskeletal injury and pain remains a common and challenging condition to manage, often requiring medications that carry risks of delayed healing, dependency, overdose, or other side effects. BPC-157, a stable gastric pentadecapeptide with regenerative and anti-inflammatory properties, has emerged as a potential non-opioid option for musculoskeletal healing and pain. In this Pilot study, patients with musculoskeletal injuries were treated with BPC-157 to evaluate its analgesic effects. Pain intensity was measured using patient-reported numeric rating scales (NRS) over several weeks following treatment. Patients received BPC-157 (500 µg) via subcutaneous injection daily for ten days.

Results showed a relevant reduction in self-reported pain scores over time, with most patients experiencing substantial improvement at 2-week intervals and 3 weeks after treatment, despite no significant improvement during the first week. Across all patients, no adverse effects were reported during the treatment with BPC-157. These findings suggest that BPC-157 may offer a safe and effective therapeutic alternative for the treatment of musculoskeletal pain. Further controlled trials are required to confirm these outcomes and to evaluate the duration of treatment and relief in musculoskeletal injuries.

Introduction

Musculoskeletal pain remains a common and challenging condition to manage typically caused by trauma, overuse, or injury. This is most likely to require drug treatment, i.e., NSAIDs and Opiates, while used for management of symptoms, there are limitations in terms of efficacy, disruption of healing, substance abuse, or toxicity potential. BPC-157, a stable gastric pentadecapeptide with regenerative and anti-inflammatory properties isolated from the human gastric juice, has been reported to have regenerative and anti-inflammatory effects in preclinical models of muscle, tendon, and nerve injury. These effects justify a place for BPC-157 in pain modulation and return to function. The aim of this study was to evaluate efficacy of BPC-157 for relief of pain in patients with musculoskeletal injuries based on patient reported outcomes following administration.

Methodology

An open-label pilot study was conducted to evaluate the effects of BPC-157 on acute and chronic musculoskeletal pain in a clinical setting. Patients were recruited via physician referral and voluntary participation. All participants provided informed consent.

Inclusion Criteria

- Adults (≥ 18 years) with acute or chronic musculoskeletal pain due to trauma or strain
- Stable use of analgesics (opioid or non-opioid) with no medication changes in the past month
- Able to self-report pain and attend weekly follow-ups
- Not enrolled in other interventional pain studies

Exclusion Criteria

- Recent changes in pain medications (within 7 days)
- Use of NSAIDs or corticosteroids within 7 days
- Autoimmune or systemic inflammatory disorders
- Pregnancy or breastfeeding
- Incomplete follow-up compliance

Procedure

Patients received BPC-157 (500 µg) via subcutaneous injection daily for 10 days. Pain scores were recorded weekly for 4 weeks using the Numeric Rating Scale (NRS).

The primary outcome was change in pain score. The secondary outcome was quality of life, based on changes in sleep, mobility, and daily function. The study was approved by an Institutional Review Board (IRB).

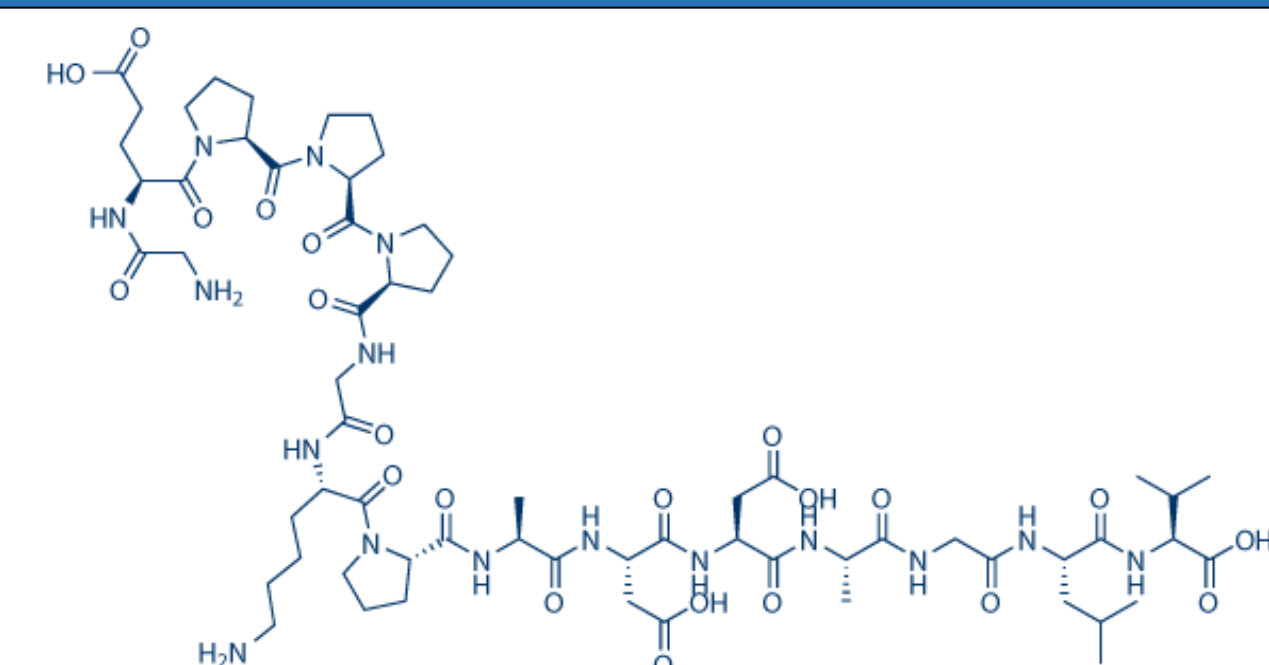


Figure 1. Chemical structure of BPC-157, a synthetic pentadecapeptide derived from human gastric juice. BPC-157 exhibits regenerative and anti-inflammatory properties and is under investigation as a therapeutic agent for musculoskeletal pain.

Results

Eleven patients were enrolled in this open-label pilot study; ten completed all four weeks of follow-up and were included in the final analysis ($n = 10$).

Pain scores were analyzed using repeated measures ANOVA, followed by Dunnett's multiple comparisons test to evaluate differences between Week 1, which is the baseline score, and subsequent timepoints.

There was no significant change in pain scores between Week 1 and Week 2 ($p = 0.2159$), indicating that immediate analgesic effects were not observed. By Week 3, a statistically significant reduction in pain was reported compared to baseline ($p = 0.0299$).

This reduction was even more pronounced by Week 4, with continued significance ($p = 0.0131$).

These findings suggest that the analgesic effect of BPC-157 emerged gradually, with improvements becoming statistically and clinically relevant after the second week of treatment. No adverse events were reported by any participants during the study period.

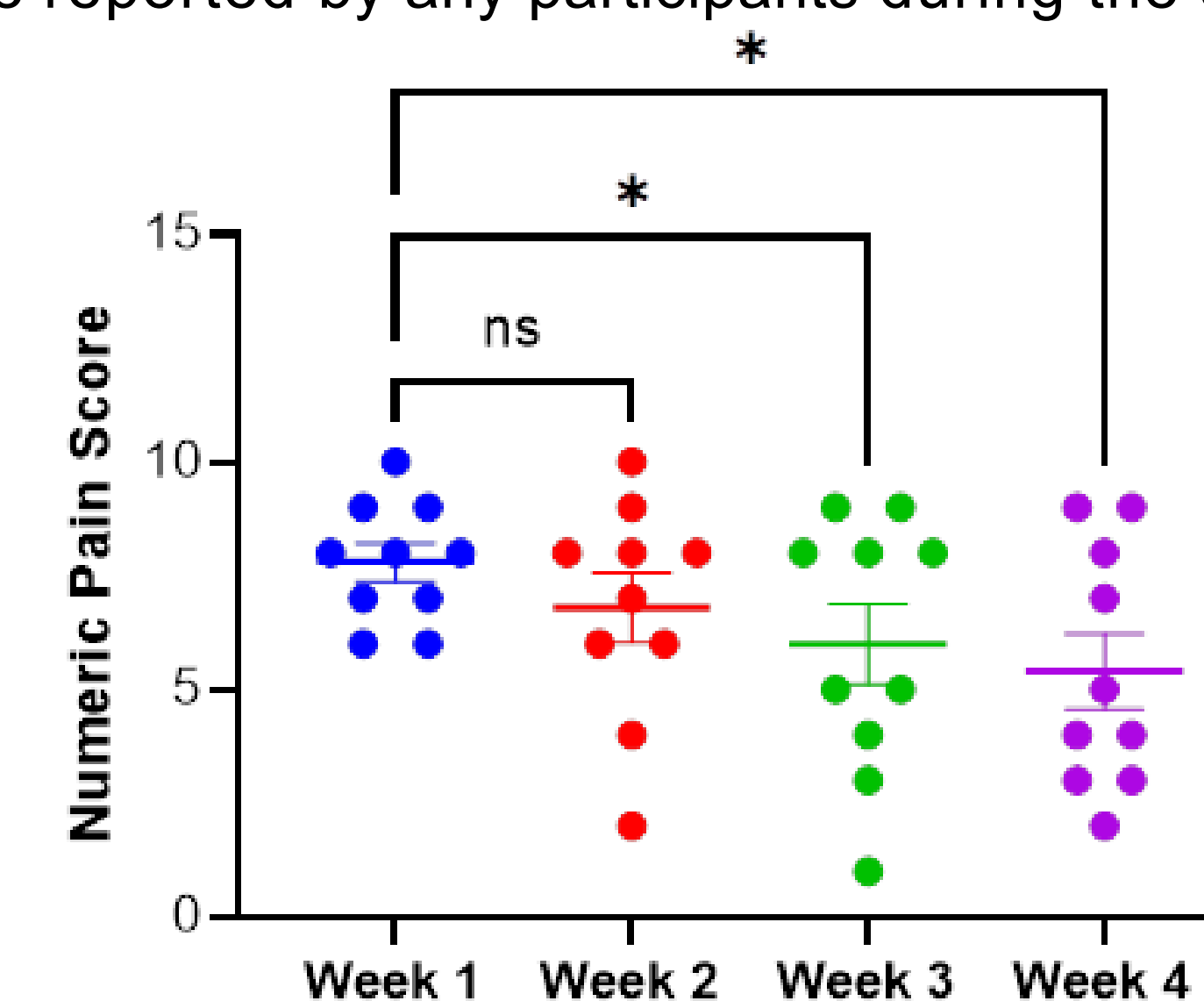


Figure 2. Weekly pain scores of patients during BPC-157 treatment.(Each dot = individual patient; bars represent mean $\pm$ SEM; * = $p < 0.05$, ns = not significant)Pain scores declined significantly beginning in Week 3. No adverse effects were reported during the study.

Discussion

The analgesic effect of BPC-157 may result from its modulation of inflammatory mediators. It stabilizes the nitric oxide (NO) system and regulates pro-inflammatory cytokines like TNF- α and IL-1 β , which are involved in pain sensitization. BPC-157 also increases IL-10, an anti-inflammatory cytokine, suggesting a dual action at both peripheral and systemic levels—consistent with preclinical models of injury and inflammation.

While pain scores improved significantly by Weeks 3 and 4, the lack of early response supports a regenerative rather than purely symptomatic mechanism. However, the absence of a control group, small sample size, and subjective outcomes limit the strength of conclusions.

Future research should include randomized, placebo-controlled trials with longer follow-up, functional outcome measures, and structured monitoring to confirm efficacy, ideal dosing, and safety in humans.

Conclusion

BPC-157 demonstrated promising results in reducing musculoskeletal pain in this patient population. Patients experienced pain relief and improved function throughout the treatment period apart from the two patients. These clinical outcomes are supported by known mechanistic actions of BPC-157, including modulation of pro-and anti-inflammatory cytokines and stabilization of the nitric oxide signaling pathway. Together, these effects suggest BPC-157 may serve as a safe and effective non-opioid alternative for managing acute musculoskeletal pain. Larger controlled clinical trials are needed to validate these findings and establish standardized protocols for therapeutic use.

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