



EFFECT OF MANUAL MUSCLE RELEASE TECHNIQUE VS FASCIA GUN RELEASE TECHNIQUE AND CRYOTHERAPY IN CALF MUSCLES STIFFNESS OF FOOTBALL PLAYERS

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ABSTRACT

Background: Calf muscle stiffness is a risk factor of football player injury. This randomized controlled trial involved a comparison of manual muscle release (MMR) and fascia gun release (FGR) and cryotherapy.

Methods: The selection of methods was randomized (simple random sampling in sealed envelopes) to Group A (MMR + cryotherapy, n=15) or Group B (FGR + cryotherapy, n=15) in which there were 30 professional male football players (age range 18-25 years) with calf stiffness. Interventions: 5 sessions alternating on 10 days; MMR/FGR in the first 10 minutes of the session and 15 minutes of cryotherapy. Outcomes Visual Analog Scale (VAS) pain, dorsiflexion ROM of the ankle (goniometer), pre/post-intervention.

Analysis: SPSS v24; t-paired/t-independent ($p < 0.05$), Shapiro-Wilk test of normality.

Results: The results of both groups were significantly improved (Group A: VAS D1.86, ROM D6.27; Group B: VAS D1.93, ROM D6.13; all $p < 0.0001$). Between groups Group B better (VAS $F = 9.877$, ROM $F = 83.50$, $p < 0.0001$). No adverse events.

Conclusion: FGR is better than cryotherapy in the reduction of calf stiffness.

KEYWORDS: Calf Muscle Stiffness, Fascia Gun, Myofascial Release, Cryotherapy, Football Players.

INTRODUCTION

Football involves high-intensity intermittent activities, predisposing players to lower limb injuries, with calf muscle tightness implicated in 0.6 injuries/player/season.^[1] Stiffness reduces ROM, increasing injury risk.^[2] MMR targets fascial restrictions manually; FGR uses percussive vibration for efficiency.^[3,4] Cryotherapy reduces inflammation post-session.^[5] This trial hypothesized FGR + cryotherapy superior to MMR + cryotherapy in reducing calf stiffness.

METHODS

Design: Assessor blinded to group; single-blind parallel randomized controlled experiment (allocation hidden). Dr. MGR Institutional Ethics Committee (IEC/2025/PT/023, Jan 2025) granted ethical approval and the study was started in Feb-Mar 2025, physiotherapy OPD, Dr. MGR University, Chennai, after getting informed written consent from the subjects.

Subjects: Male elite football players (18-25y, calf stiffness VAS > 4/10, ROM < 15deg dorsiflexion). Exclusions: history

injury less than 6 months, medications. Sample size: n = 30 (15/group) with sample pilot SD = 2, effect size = 1.0, power = 80, $\alpha = 0.05$.^{[3][15]}

Randomization: Simple random (sealed opaque envelopes, independent allocator).

Interventions: 5x (altering days, 10d in total). MMR (Group A): Sustained perpendicular pressure of 10min/leg using lubricant.^[6] FGR (Group B): Percussion gun (frequency 40Hz, amplitude 12mm), sweeping perpendicular motions 10min/leg.^[3] Both followed by 15min ice pack (10-15°C) Fidelity: Therapist checklist (100% compliance). Home exercise: Standardized stretching.

Measurements: VAS (0-10) pain is the primary measurement; ROM (universal goniometer, knee-extended) is the secondary measurement. Assessor blindfolded before and after day 10. ICC > 0.9 indicates reliability.



Analysis: Shapiro-Wilk normality. Interclass and intraclass t-tests. Cohen's d is the effect size. intending to treat^{[3][1]}

RESULTS

Flow: All 30 completed (Figure 1). Baseline balanced (age 21.5±2.1y, VAS 5.53±0.8, ROM 10.2±1.5°)^[1]

Table 1: Group A(MMR)

Outcome	Pre (mean±SD)	Post (mean±SD)	Δ	t(df=14)	p	d
VAS	5.53±0.74	3.67±0.82	1.86	9.73	<0.0001	2.5
ROM (°)	10.47±2.22	16.73±1.28	6.27	10.94	<0.0001	2.8

Table 2: Group B (FGR)

Outcome	Pre (mean±SD)	Post (mean±SD)	Δ	t(df=14)	p	d
VAS	5.53±0.96	3.60±0.91	1.93	7.79	<0.0001	2.0
ROM (°)	9.87±1.64	16.00±1.22	6.13	14.47	<0.0001	3.7

Between-Group: Group B superior (Table 3; p<0.0001). No AEs.

Table 3: Between-Group Post-Test

Outcome	Group A Post	Group B Post	F	p
VAS	3.67±0.82	3.60±0.91	9.88	<0.0001
ROM (°)	16.73±1.28	16.00±1.22	83.50	<0.0001

Within-Group: Both big and significant differences (Table 1-2; d>1.5).

DISCUSSION

Ekstrand et al. (2014) noted calf injury epidemiology in football.^[1] Prior studies support this: Renan et al. (2011) on myofascial therapy for heel pain;^[2] Ramos Gonzalez et al. (2012) favoring instrument-assisted release;^[3] Bearsley (2015) on self-myofascial release for flexibility;^[4] FGR + cryotherapy was superior to MMR, probably because it penetrated deeper and provided neuromuscular feedback.^[3,4] Schroeder et al. (2015) on roller massage recovery.^[7]

Limitations: Short term follow-up, single center, no quantification of MRI stiffness, non-blinded therapist.

Future recommendations: Long term, multi-site, imaging.

Clinical Implication: FGR presents an effective field-side intervention of footballers.

CONCLUSION

FGR and cryotherapy have been shown to be effective in minimizing calf stiffness in football players better than MMR.

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Conflict of Interest: Declared none.

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