

Early Functional Bracing Versus Coaptation Splinting for Closed Humeral Shaft Fractures: Critical Narrative Review

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Abstract: ***Background:** Functional bracing is a common nonoperative treatment for humeral shaft fractures, yet the timing of brace application during acute swelling affects early comfort and skin safety. **Objective:** To appraise the 2026 Journal of Orthopaedic Trauma COBRAS randomized trial and place its short-term findings within the broader fracture-care pathway. **Methods:** A focused narrative review of COBRAS and selected randomized trials comparing operative fixation with functional bracing. No systematic search or meta-analysis was performed. **Results:** In 58 analyzed patients, immediate Sarmiento bracing produced a mean 0.97-point higher daily pain rating over the first ten days than initial coaptation splinting (95% CI 0.26–1.69). Skin complications were reported in 33.3% and 7.1%, respectively. Day-seven function, cumulative opioid consumption, and satisfaction did not differ significantly. These outcomes concern initial immobilization, not fracture union or the choice between surgery and nonoperative care. **Conclusion:** Initial coaptation splinting with planned conversion after swelling subsides is a reasonable default for eligible closed fractures, provided fit, skin, neurovascular status, and alignment are reassessed. Longer term treatment decisions require a separate discussion of nonunion risk, functional recovery, and operative harms. [1–3]*

Keywords: humeral shaft fracture; coaptation splint; Sarmiento brace; functional bracing; pain; skin complication

1. Introduction

A patient selected for nonoperative management of a closed humeral shaft fracture needs a tolerable immobilization strategy before a definitive functional brace fits well. Acute swelling, dependent edema, changing arm circumference, and pressure over bony areas make the first days different from later bracing. A coaptation splint can support the arm while swelling settles; immediate circumferential bracing may reduce the number of device transitions but may require prompt adjustment as the limb changes. Evidence about this early choice has been sparse. [1]

The August 2026 COBRAS trial directly compared initial coaptation splinting followed by delayed Sarmiento bracing with immediate Sarmiento bracing. Its primary clinical contribution is to the initial ten-day experience of patients suitable for a nonoperative pathway. Other randomized trials ask whether to use surgery instead of bracing; those trials provide context for counselling, but their treatment effects cannot be used to infer that one temporary immobilizer improves union or prevents later surgery. [1–3]

2. Review Approach

We appraised the publicly accessible COBRAS report and selected original randomized studies of humeral shaft fracture management, emphasizing population, timing, denominator, measured outcomes, treatment crossover, and clinical importance. This is a selective critical narrative review without protocol registration, duplicate screening, formal risk-of-bias scoring, or quantitative pooling. Detailed COBRAS protocol aspects and event severity should be verified against the full article before journal submission. [1–3]

The COBRAS randomized trial

Kingery, Ganta, and Egol conducted a randomized, two-arm trial across three centers within one academic system. Patients had acute closed AO/OTA 12A, 12B, or 12C humeral shaft fractures and received either a coaptation splint with later transition to a Sarmiento brace or an immediate Sarmiento brace. Fifty-eight participants were included in the reported analysis, with a mean age of 48.8 years and a broad adult age range. Pain was recorded once daily at a similar time over the first ten postinjury days; other endpoints included skin damage, opioid consumption in morphine milligram equivalents (MME), PROMIS Physical Function, and satisfaction. [1]

The mean treatment effect for daily pain favored initial splinting by 0.97 points on a 0–10 scale (95% CI 0.26–1.69; $P = .010$). Skin-related complications occurred in 33.3% after immediate bracing versus 7.1% after splinting ($P = .022$). The published definition ranged from abrasion or blistering to full-thickness pressure-related skin loss; the abstract does not establish that severe injuries accounted for the between-group difference. Absolute risk difference is approximately 26 percentage points, but the small number of events makes its precision uncertain. [1]

Endpoint	Initial coaptation splint	Immediate Sarmiento brace
Daily pain, days 1–10	Reference	Mean 0.97 points higher (95% CI 0.26–1.69)
Skin complication	7.10%	33.3%; $P = .022$
Cumulative opioid use	Median 20.0 MME	Median 32.5 MME; $P = .308$
PROMIS function, day 7	Median 53.0	Median 51.1; $P = .756$
Satisfaction, day 7	Mean 6.3	Mean 5.8; $P = .520$

Table 1. Short-term results reported by COBRAS. Pain is the modeled between-group treatment effect; the table does not supply arm-specific mean pain scores. A nonsignificant difference in a secondary outcome does not establish equivalence. [1]

The 12.5-MME numerical difference in median opioid use was not statistically significant ($P = .308$). Day-seven median PROMIS function was 53.0 after splinting and 51.1 after immediate bracing ($P = .756$); satisfaction means were 6.3 and 5.8 ($P = .520$). These small-sample comparisons should be described as no demonstrated difference, not evidence of identical analgesic need or function. A one-point average pain difference may be worthwhile to some patients during the acute phase, although a prespecified patient-important threshold for this specific ten-day trajectory is not apparent from the abstract. [1]

Interpretation of the early skin and pain signals

The trial supports a practical explanation: a rigidly timed device decision during evolving swelling can create local pressure or require more adjustments. Yet the mechanism was not isolated experimentally. Splints and braces differ in material, contact area, padding, fitting, motion allowed, and scheduled reassessment. Clinicians and patients could not realistically be blinded to the assigned device, so daily pain and satisfaction could also reflect expectations and co-interventions. Multicenter recruitment improves applicability, while the single-system setting and 58 analyzed participants limit certainty about rare severe skin injury and important subgroups. [1]

The higher skin-event proportion is clinically relevant even when many events are minor, because a small superficial abrasion can prompt discomfort, repeat visits, or device modification. Severity and anatomical distribution should guide response rather than an undifferentiated event label. The trial does not report a long enough primary observation window to conclude that splint-first treatment improves radiographic alignment, fracture union, return to work, or avoidance of surgery. Reassessment after conversion remains an essential part of the treatment strategy. [1]

How the initial device fits into the full pathway

The FISH trial randomized 82 adults with closed displaced humeral shaft fractures to plate fixation or functional bracing. At 12 months, mean DASH disability scores were 8.9 and 12.0, a difference of -3.1 points (95% CI -9.6 to 3.3), below its 10-point clinical-importance threshold and statistically nonsignificant. However, 11 of 44 patients assigned to bracing (25%) developed nonunion and 13 of 44 (30%) underwent surgery during follow-up; three temporary radial nerve palsies occurred after assigned surgery. FISH compares complete treatment strategies, including rescue surgery, and therefore does not test the initial splint-versus-brace question. [2]

The 2025 HU-FIX randomized trial enrolled 70 patients. Operative fixation was associated with a 15.0-point better DASH score at three months, with advantages also reported at six weeks, but no significant DASH difference at six or twelve months. Nonunion occurred in 6% of operative and 18% of nonoperative patients (overall comparison $P = .14$), and brace-related dermatitis was reported in 18% versus 3% after surgery ($P = .05$). Dermatitis across a bracing course is not the same endpoint as COBRAS pressure-related skin events during ten days. Nor does a favorable early splinting experience eliminate the nonunion and delayed-surgery considerations relevant to definitive management. [3]

An initially comfortable splint must therefore be treated as the first step in surveillance, not as evidence that a fracture will heal without intervention. Follow-up should document pain trajectory, swelling, skin, brace fit, neurovascular examination, alignment, function, and radiographic progress at clinically appropriate intervals. Patients should understand when the splint will be changed, whom to contact about pressure or escalating pain, and how decisions about continuation, adjustment, or surgery will be revisited. These are implementation priorities inferred from the trials, rather than a validated follow-up schedule tested by COBRAS. [1–3]

3. Limits and Future Research

COBRAS included only acute closed fractures eligible for its two nonoperative protocols. Its results should not automatically be extended to open injuries, vascular compromise, marked polytrauma, or circumstances requiring immediate fixation. Baseline fracture level, soft-tissue condition, obesity, and compliance may influence device tolerance, but subgroup effects cannot be confidently estimated from 58 participants. The report should be examined for timing of transition, protocol deviations, missing daily ratings, reasons for skin events, and whether the same criteria determined adjustment in each arm. [1]

A larger trial could use patient-important pain thresholds, a prespecified skin-event severity scale, daily device-adjustment records, and separate estimates for older adults and different fracture locations. Longer follow-up could test whether an early comfort advantage changes adherence, union, crossover, and resource use. Such research should preserve the randomized initial-device comparison while explicitly recording later treatment, because selection into surgery can otherwise obscure the effect of the original assignment. [1–3]

4. Conclusion

For selected closed humeral shaft fractures managed nonoperatively, COBRAS found less pain and fewer early skin complications with an initial coaptation splint than with immediate

Sarmiento bracing, without demonstrated differences in day-seven function, opioid use, or satisfaction. The trial supports splint-first care with planned transition and close fit checks during swelling change.

It cannot determine which patients should undergo surgery or whether initial splinting improves union. Those longer term questions require separate patient-centred counselling and surveillance. [1–3]

Declarations

This narrative review draft contains no new patient data. Submitting authors should add their identities, affiliations, funding and conflict disclosures, and check trial details and target-journal requirements against the full reports before submission.

References

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