PART IX

# Pain, Injury and Return-to-Skill

Load management, recovery and graded return.



Chapter 143

# How handstand injuries happen

CLINICIAN | COACH | ATHLETE

Handstand injuries usually arise from a mismatch between load, position, repetition and tissue capacity. A single fall can cause acute injury, but many problems come from progressive overload without adequate adaptation.

The wrist is exposed to repeated extension and compression, the elbow to long-arm support, the shoulder to overhead loading, and the spine to line-control demands. Fatigue and poor exits magnify the risk.

The professional question is not whether handstands are dangerous. The question is whether the chosen handstand dose matches the athlete today.

**Table IX.1. Load-capacity mismatch examples**

| Region | Common stressor | Capacity decision |
|---|---|---|
| Wrist | High-volume extension loading | Reduce angle and volume |
| Elbow | Repeated locked support | Assess pain and control |
| Shoulder | Sagging overhead fatigue | Rebuild support endurance |
| Neck | Poor exit or head position | Modify gaze/exits |
| Lumbar spine | Banana-line fatigue | Improve rib-pelvis control |

**KEY IDEA**

Injury risk is a load-capacity decision, not a label attached to the skill.

**EVIDENCE NOTE**

Gymnastics upper-extremity injury literature and IOC load consensus statements support graded exposure and load monitoring.

**CREDIBILITY & CAUTION**

This book does not diagnose injuries. Persistent, severe or neurological symptoms require qualified medical assessment.

*Figure IX-1. Return-to-skill logic after pain.*

## FIGURE 84 | Return-to-Wall Progression




After symptoms settle, return to wall-supported inversion gradually, building tolerance, line control and confidence step by step.

Chapter 144

# Wrist pain patterns and referral logic

CLINICIAN COACH

Wrist discomfort during early loading can reflect adaptation demand, but sharp pain, swelling, loss of function, ulnar-sided symptoms or pain during daily tasks changes the decision.

The first response is not to stretch harder. Reduce load, reduce angle, monitor response, and refer when red flags or persistent symptoms appear.

A return plan rebuilds range, pressure tolerance and inversion exposure separately before combining them again.

**Table IX.2. Wrist decision rules**

| Symptom | Decision |
|---|---|
| Mild pressure only during loading | Reduce volume and monitor |
| Sharp pain on extension | Stop loaded extension and assess |
| Ulnar-sided pain | Refer if persistent or functional |
| Swelling/loss of grip | Medical review |
| Next-day escalation | Reduce exposure immediately |

**KEY IDEA**

The wrist is both the base and the steering system; pain here changes every handstand decision.

**EVIDENCE NOTE**

Common upper-extremity gymnastics injury literature provides wrist-specific return-to-sport protocols and caution around repeated loading.

**CREDIBILITY & CAUTION**

Do not continue full handstand loading with worsening wrist pain or symptoms that persist outside training.

*Figure IX-2. Priority red flags for professional review.*

## FIGURE 87 | Pain-Monitoring Positions




Pain-monitoring positions can help the athlete and clinician judge tolerance as load rises from simple support to more inverted tasks.

Chapter 145

# Elbow pain and lockout stress

CLINICIAN COACH

The elbow may complain when the athlete repeatedly dumps into passive lockout, bends under fatigue or twists during entry and walking.

The first mechanical question is whether the elbow is acting as a stable transmitter or as an emergency hinge. Painful lockout requires load reduction and careful reassessment.

Return should begin with lower-angle pike support, controlled long-arm loading and gradual exposure to inversion.

**Table IX.3. Elbow return ladder**

| Level | Task | Advance when |
|---|---|---|
| 1 | Pain-free range and light support | No daily pain |
| 2 | Incline long-arm holds | No lockout symptoms |
| 3 | Pike support | Shoulder stays active |
| 4 | Wall holds | No symptom rise |
| 5 | Freestanding attempts | Controlled exits |

**KEY IDEA**

Elbow pain often reveals poor load transmission or excessive passive reliance.

**EVIDENCE NOTE**

Handstand systematic findings include elbow involvement as part of mixed control strategies, while gymnastics injury literature highlights upper-extremity stress across the sport.

**CREDIBILITY & CAUTION**

Pain with instability, trauma or loss of motion is not a coaching problem alone.

Chapter 146

# Shoulder pain and overhead loading

CLINICIAN COACH

Shoulder pain in handstand work can reflect insufficient mobility, low support capacity, poor scapular control, excessive volume or inappropriate advanced progressions.

The shoulder must flex, elevate, stabilise and transmit force. If any of these fail, the athlete may compensate through lumbar extension, elbow bend or neck position.

Return should restore pain-free overhead range, active elevation, scapular control, then wall loading before dynamic walking or handstand push-ups.

**Table IX.4. Shoulder pain decisions**

| Finding | Likely decision |
|---|---|
| Pain overhead unloaded | Clinical assessment before loading |
| Pain only under fatigue | Reduce volume and restore endurance |
| Shoulder sag | Rebuild elevation capacity |
| Pinching with wall line | Modify angle and assess mobility |
| Pain with instability feeling | Refer |

**KEY IDEA**

The shoulder must be mobile enough to stack and strong enough to support.

**EVIDENCE NOTE**

Handstand EMG and apparatus studies support the central role of shoulder-girdle musculature in inverted support.

**CREDIBILITY & CAUTION**

Do not add kipping, walking or handstand push-ups to unresolved shoulder pain.

Chapter 147

# Neck and cervical safety

**CLINICIAN** **COACH**

The neck should not be the load-bearing structure in normal handstand training. Head position should support vision without forcing excessive cervical extension.

Kipping handstand push-ups and failed exits can introduce head or neck contact forces, which require conservative programming and clear standards.

Coaches should teach neutral-ish head control, safe bail options and strict stop rules for any symptom involving dizziness, neurological signs or neck pain.

**Table IX.5. Neck safety audit**

| Risk | Prevention |
|---|---|
| Head throw in entry | Quiet gaze and wall drills |
| Crash exit | Teach bail before free attempts |
| Kipping contact | Strict strength prerequisites |
| Dizziness | Stop inversion and assess |
| Neck pain | Remove loading and refer if persistent |

**KEY IDEA**

The neck must guide vision, not absorb the handstand.

**EVIDENCE NOTE**

Handstand push-up technique literature recognises the skill as a dynamic upper-extremity exercise requiring strength and stability; clinical caution is required for head/neck contact variants.

**CREDIBILITY & CAUTION**

Dizziness, neurological symptoms, headache after impact, or neck pain after a fall require medical review.

Chapter 148

# Return-to-wall, return-to-free and return-to-walk

CLINICIAN | COACH | ATHLETE

Return-to-skill should rebuild exposure in layers. Pain-free daily function does not automatically mean readiness for full handstand walking.

The sequence is range, low load, wall load, controlled wall separation, freestanding entry, short free holds, then dynamic walking. The athlete may stay at any level until response is stable.

Return is successful when the athlete can complete the required exposure and recover without symptom escalation.

**Table IX.6. Return-to-skill ladder**

| Stage | Allowed task | Pass standard |
|---|---|---|
| 0 | No loaded inversion | Symptoms calm |
| 1 | Mobility and low-load prep | No next-day rise |
| 2 | Pike and incline holds | Pressure tolerated |
| 3 | Wall holds | Line and exit safe |
| 4 | Heel/toe pulls | Correction safe |
| 5 | Freestanding attempts | Bail controlled |
| 6 | Walking | Volume recovers |

**KEY IDEA**

Return to handstand is graded exposure plus retesting.

**EVIDENCE NOTE**

Gymnastics-specific return-to-play literature supports staged return protocols after upper-extremity injury.

**CREDIBILITY & CAUTION**

Never use pain tolerance as the main return criterion. Pain response, function, confidence and mechanical quality all matter.

# PART IX reference apparatus

**EVIDENCE HIERARCHY**

Direct handstand studies are prioritised first; gymnastics, motor-control, strength-training, and clinical load-management literature are used only when they explain mechanisms not yet isolated in handstand-specific trials.

**Table R.1. Evidence-to-practice translation audit**

| Source type | Use in this part | Limit |
|---|---|---|
| Direct handstand biomechanics | Balance, CoP/CoM, wrist strategy, press-to-handstand, EMG | Often small samples and expert-biased cohorts |
| Gymnastics injury / RTP | Wrist, elbow, shoulder, spine loading and return-to-sport logic | Sport-specific, not always transferable to recreational adults |
| Motor learning | Cueing, feedback, variable practice, skill retention | Requires contextual coaching judgement |
| Strength and load-management consensus | Progression, tissue adaptation and monitoring | Does not replace individual assessment |

## Core references used in this part

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# Transition to the next part

Part X now converts the entire book into coaching systems, programmes, assessments, cue libraries, templates and a professional reference apparatus.

# HS-FIG-079 | Wrist Overload Patterns

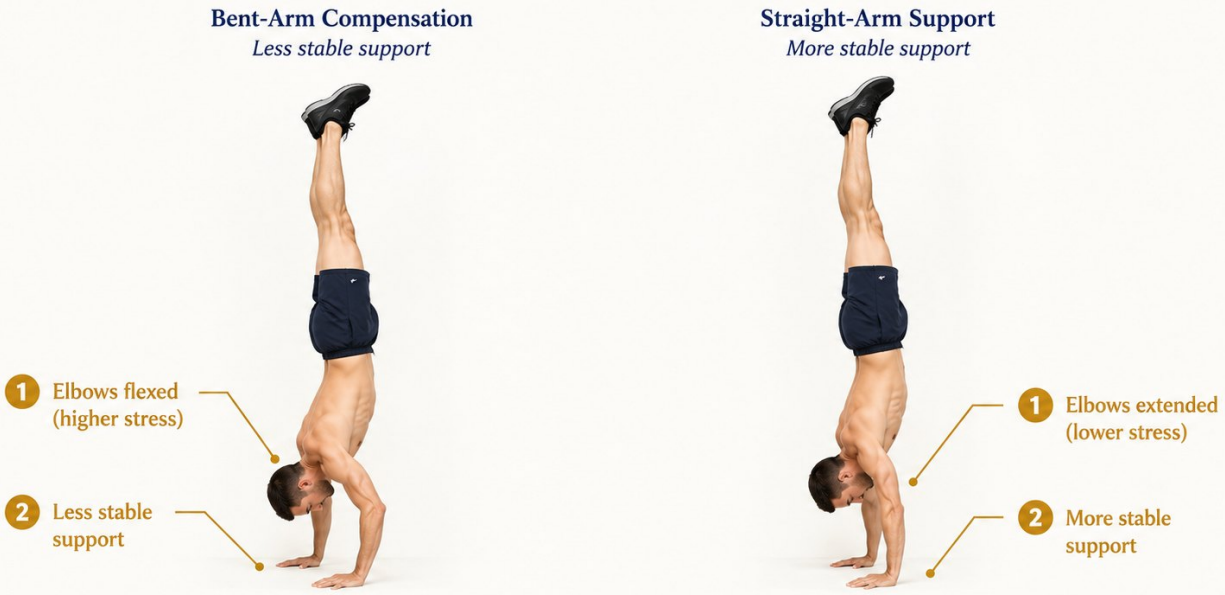
## FIGURE 79 | Wrist Overload Patterns




When the wrist position is poorly organised, stress on local structures rises; a better stacked loading pattern usually distributes force more effectively.

# HS-FIG-080 | Elbow Stress And Bent Arm Compensation

## FIGURE 80 | Elbow Stress and Bent-Arm Compensation




Bent-arm compensation can increase local stress and reduce line control, whereas a stronger straight-arm position usually improves support and stability.

# HS-FIG-081 | Shoulder Pain Pattern Collapsed Overhead Support

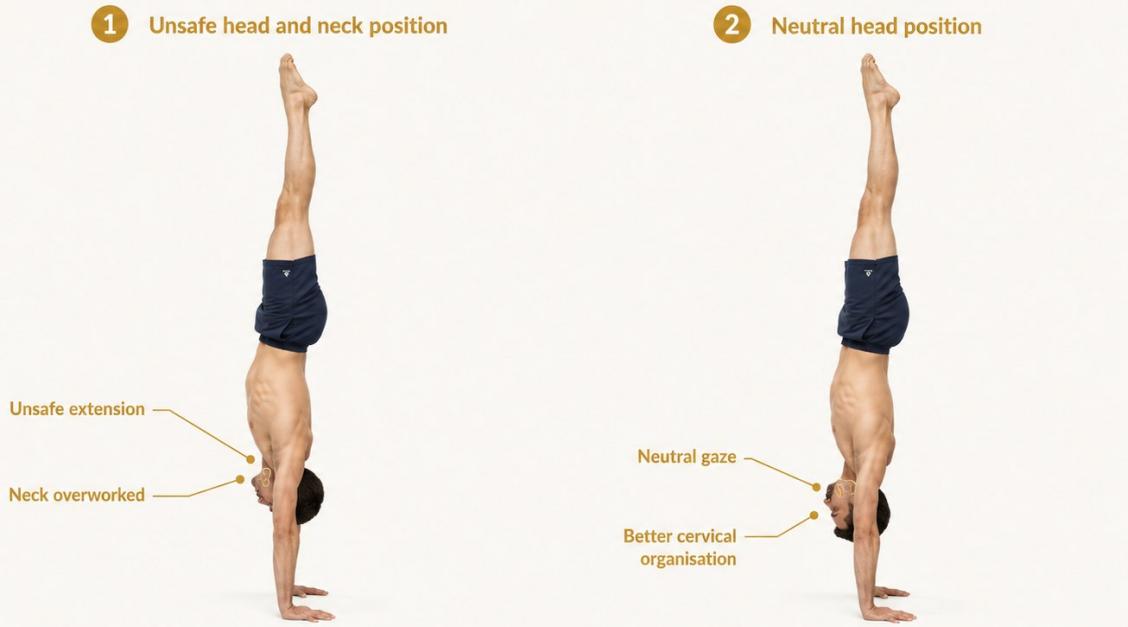
## FIGURE 81 | Shoulder Pain Pattern: Collapsed Overhead Support




Collapsed overhead support can increase local shoulder stress; active elevation and a better stacked line usually improve support quality.

# HS-FIG-082 | Neck And Head Position Warning Signs

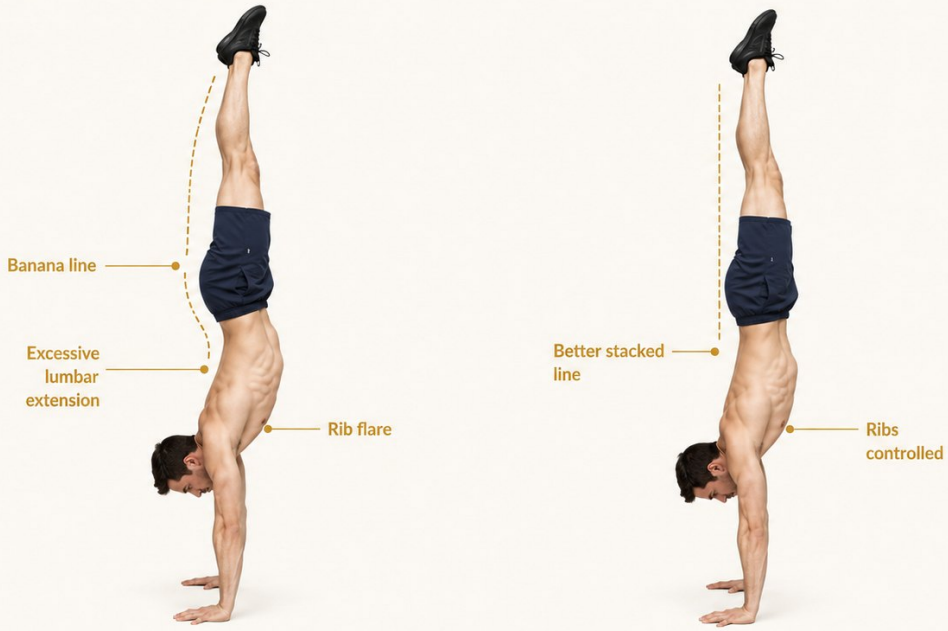
## FIGURE 82 | Neck and Head-Position Warning Signs




Excessive neck extension can disturb balance and increase local strain; a neutral head position usually improves line control.

# HS-FIG-083 | Low Back Extension Intolerance Banana Overload

## FIGURE 83 | Low-Back Extension Intolerance / Banana Overload




Excessive lumbar extension can raise local demand and reduce line efficiency; a more controlled stack often distributes load better.

# HS-FIG-084 | Return To Wall Progression

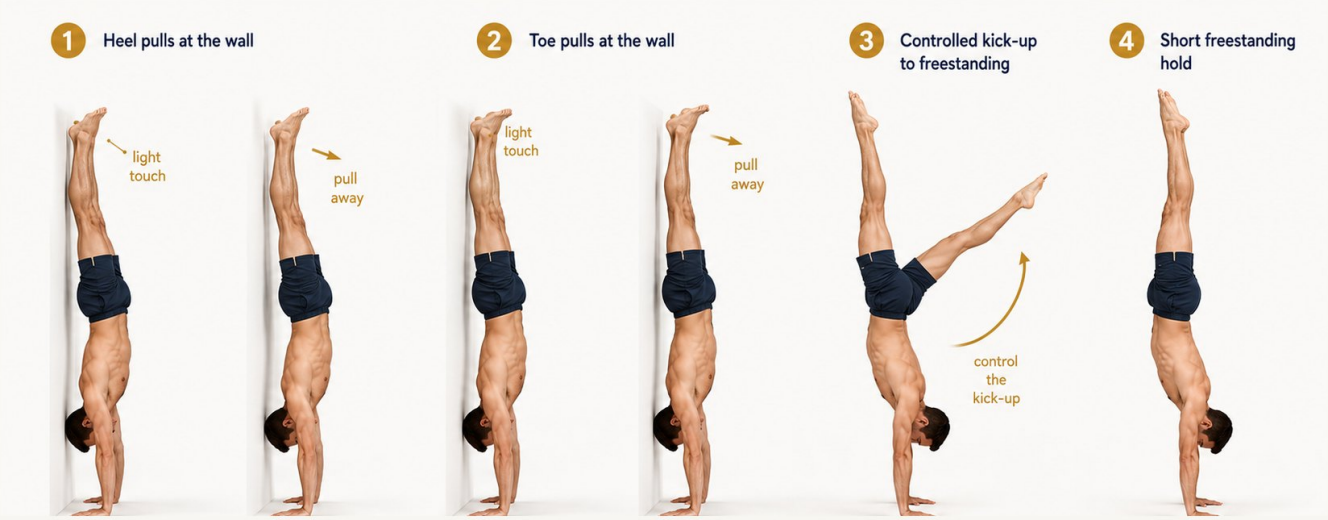
## FIGURE 84 | Return-to-Wall Progression




After symptoms settle, return to wall-supported inversion gradually, building tolerance, line control and confidence step by step.

# HS-FIG-085 | Return To Freestanding Progression

## FIGURE 85 | Return-to-Freestanding Progression




Return from wall support to freestanding balance only after each step is calm, repeatable and symptom-free.

# HS-FIG-086 | Return To Walking Progression

## FIGURE 86 | Return-to-Walking Progression




Reintroduce walking gradually by restoring stable support, then controlled weight shift, then small steps before longer sequences.

# HS-FIG-087 | Pain Monitoring Positions

## FIGURE 87 | Pain-Monitoring Positions




Pain-monitoring positions can help the athlete and clinician judge tolerance as load rises from simple support to more inverted tasks.

# HS-FIG-088 | Confidence Rebuilding After Pain

## FIGURE 88 | Confidence Rebuilding After Pain




Confidence often returns best when support is reduced gradually and each small success is repeated under control.