PART V

MOBILITY, STRENGTH AND CAPACITY FOUNDATIONS

Prepare the wrists, shoulders, trunk and line.



WRISTS
Prepare & Protect

SHOULDERS
Build Strength & Control

TRUNK
Stability & Alignment

CAPACITY
Build Endurance

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Chapter 61

Wrist extension capacity

BEGINNER | CLINICIAN | COACH

The handstand asks the wrist to bear bodyweight in extension. That is not a minor mobility detail; it is the first mechanical gate into safe inversion.

Passive wrist extension is only the beginning. The athlete must also tolerate compressive load, finger pressure, repeated exposure and small centre-of-pressure shifts without symptom escalation.

A professional progression starts with unloaded range, then quadruped loading, then inclined loading, then wall-supported loading, and only later high-volume freestanding work.

Table V.1. Wrist capacity ladder

Level	Task	Pass criterion
1	Pain-free unloaded extension	Comfortable range both sides
2	Quadruped rock	No sharp pain or guarding
3	Incline handstand lean	Even palm and finger pressure
4	Wall hold	No symptom increase next day
5	Freestanding pressure shifts	Control without wrist threat

KEY IDEA

A wrist that can move is not automatically a wrist that can load.

EVIDENCE NOTE

Gymnastics injury literature consistently identifies the wrist as a major load-bearing region; handstand balance literature places wrist strategy at the centre of control.

CREDIBILITY & CAUTION

Persistent ulnar-sided wrist pain, swelling, loss of grip or pain in daily activities requires professional assessment before further inversion loading.

Figure V-1. Capacity exposure curve across an eight-week on-ramp.

FIGURE 40 | Wall Plank & Pike Load



Wall plank and pike-loading drills build the foundational shoulder and trunk support needed before full inversion.

Chapter 62

Elbow lockout and load line

COACH ATHLETE

The elbow should transmit force without becoming the main balance hinge. Some athletes naturally hyperextend; others struggle to lock out. Both patterns need coaching rather than moral judgement.

The goal is a stable long-arm support that stacks the elbow between wrist and shoulder while allowing the shoulder and hand to regulate balance.

If the elbow bends under load, the athlete may lack confidence, shoulder support, triceps endurance or entry control. The correction depends on the cause.

Table V.2. Elbow patterns

Pattern	Likely cause	Decision
Soft elbow	Fear or low support capacity	Regress to pike and wall line
Locked but collapsed shoulder	Shoulder not elevating	Serratus and push-tall drills
Painful lockout	Tissue irritation	Reduce load and refer if persistent
Excess hyperextension	Passive lock reliance	Teach active support without dumping

KEY IDEA

The elbow is a force transmitter, not the main steering wheel.

EVIDENCE NOTE

Handstand systematic evidence describes wrist strategy first, with elbow strategy appearing as part of mixed control when other strategies are insufficient.

CREDIBILITY & CAUTION

Do not force a painful elbow into locked range. Pain, instability or history of injury changes the decision.

Chapter 63

Shoulder flexion and overhead tolerance

COACH | CLINICIAN | ATHLETE

A handstand requires the arms overhead under bodyweight. Limited shoulder flexion often appears as rib flare, lumbar extension, bent elbows or the hands placed too far from the line.

The mobility goal is not a passive wall test alone. The athlete must own the range under load with scapular elevation, upward rotation and trunk control.

Shoulder preparation should combine mobility, active end-range control, serratus work and progressive inversion exposure.

Table V.3. Shoulder readiness checkpoints

Checkpoint	Green	Yellow	Red
Wall shoulder flexion	Arms overhead without rib flare	Mild compensation	Pain or major arch
Wall handstand	Push tall retained	Fatigue sag	Unable to support
Heel pull	Shoulder line stable	Late correction	Collapse or pain
Walking prep	Weight shift controlled	Asymmetry	Sharp pain or instability

KEY IDEA

Shoulder range must become loaded overhead support.

EVIDENCE NOTE

Straight-arm press-to-handstand analysis and handstand EMG/apparatus research support the importance of shoulder mechanics and muscular control in inverted support.

CREDIBILITY & CAUTION

Pinching, apprehension or repeated shoulder pain during overhead loading should not be stretched through aggressively.

Figure V-2. Capacity domains before advanced inversion.

FIGURE 48 | Shoulder Flexion Mobility Test Position



Shoulder-flexion testing helps identify whether overhead range is sufficient for efficient handstand stacking.

Chapter 64

Scapular elevation strength

COACH ATHLETE

“Push tall” is not a decorative cue. Scapular elevation and upward rotation help create the vertical support platform that keeps the body from sinking into the shoulders.

Many beginners confuse shrugging with support. Effective elevation is coordinated with rib control, elbow lockout and pressure through the hand.

The coach should train scapular elevation in pike positions, wall handstand holds, scapular handstand shrugs and controlled shoulder taps.

Table V.4. Scapular progression

Drill	Purpose	Stop rule
Pike scap push	Learn elevation without full load	Neck pain or elbow bend
Wall scap shrug	Specific inverted elevation	Loss of line
Shoulder tap prep	Single-arm support transition	Hip twist or pain
Freestanding correction	Integrate with balance	Repeated uncontrolled saves

KEY IDEA

The shoulder girdle must lift the body away from the floor while preserving the line.

EVIDENCE NOTE

EMG and apparatus studies show that shoulder-girdle musculature contributes substantially to handstand support and stabilisation.

CREDIBILITY & CAUTION

Do not add handstand push-ups to an athlete who cannot maintain tall shoulder support in a static hold.

Chapter 65

Trunk hollow-body capacity

BEGINNER **COACH**

The trunk is the line-control column. Without rib-pelvis control, the athlete often solves shoulder limitation by arching the spine and shifting the centre of mass away from the base.

Hollow-body training should not be treated as a generic abdominal exercise. It is a line rehearsal for inversion: ribs controlled, pelvis organised, legs long and breathing quiet.

The handstand line must eventually be maintained under load, fatigue and correction, not only on the floor.

Table V.5. Trunk-line faults

Fault	Mechanical effect	Correction
Rib flare	CoM shifts and lumbar load rises	Wall hollow breathing
Anterior pelvic tilt	Banana line	Glute-rib connection drills
Leg separation	Long-lever asymmetry	Toe point and squeeze cue
Breath hold	Rigidity and fatigue	Timed nasal breathing holds

KEY IDEA

The trunk decides whether shoulder range becomes a line or an arch.

EVIDENCE NOTE

Handstand biomechanics and coaching literature consistently treat body alignment as central to balance quality and scoring aesthetics.

CREDIBILITY & CAUTION

A perfectly flat hollow shape is not the goal for every body; the goal is a controllable line that matches the skill and tolerates load.

Chapter 66

Strength endurance for wall holds

COACH | ATHLETE

Wall holds are useful when they build clean load tolerance. They become less useful when they reward collapse, breath holding or passive hanging into the shoulder structures.

The quality standard should be stricter than the clock. A twenty-second clean hold is better training than a sixty-second compensatory hold.

Endurance progresses by adding total quality exposure: more sets, slightly longer holds, shorter rest or more demanding wall angle. Only one variable should change at a time.

Table V.6. Wall-hold dosing rules

Stage	Set target	Quality rule
Early	5-10 s repeats	Exit before shake
Base	15-25 s holds	Line and breath retained
Capacity	30-45 s holds	No next-day symptom rise
Transfer	Short holds + heel pulls	Correction quality retained

KEY IDEA

Wall endurance must be measured by quality time, not survival time.

EVIDENCE NOTE

Load-management consensus statements support progressive exposure and monitoring of response rather than sudden changes in training load.

CREDIBILITY & CAUTION

Do not increase handstand volume when next-day wrist or shoulder symptoms are rising.

Chapter 67

Press-to-handstand prerequisite strength

ADVANCED **COACH**

The straight-arm press to handstand is a different task from a kick-up. It demands shoulder compression, trunk control, hip compression, scapular support and the ability to move the centre of mass over the hands without momentum.

Press training should begin with compression strength, elevated pike shifts, straddle leans and eccentric patterning before demanding a clean floor press.

A press built on uncontrolled elbow bend or lumbar dumping is not a press foundation. It is compensation.

Table V.7. Press prerequisites

Capacity	Minimum sign	Prep drill
Shoulder lean tolerance	Controlled pike lean	Box pike lean
Compression	Knees-to-chest lift control	Seated compression lifts
Scapular support	Tall arms during lean	Pike scap shrugs
Balance transfer	Controlled toe float	Straddle toe-lift attempts

KEY IDEA

The press converts balance into slow centre-of-mass management.

EVIDENCE NOTE

Mizutori and colleagues examined kinematics and joint moments during straight-arm press to handstand in highly skilled male gymnasts, supporting the need for specific joint-moment preparation.

CREDIBILITY & CAUTION

Do not add press volume to athletes with wrist pain or poor shoulder support. The loading time under compression is high.

PART V 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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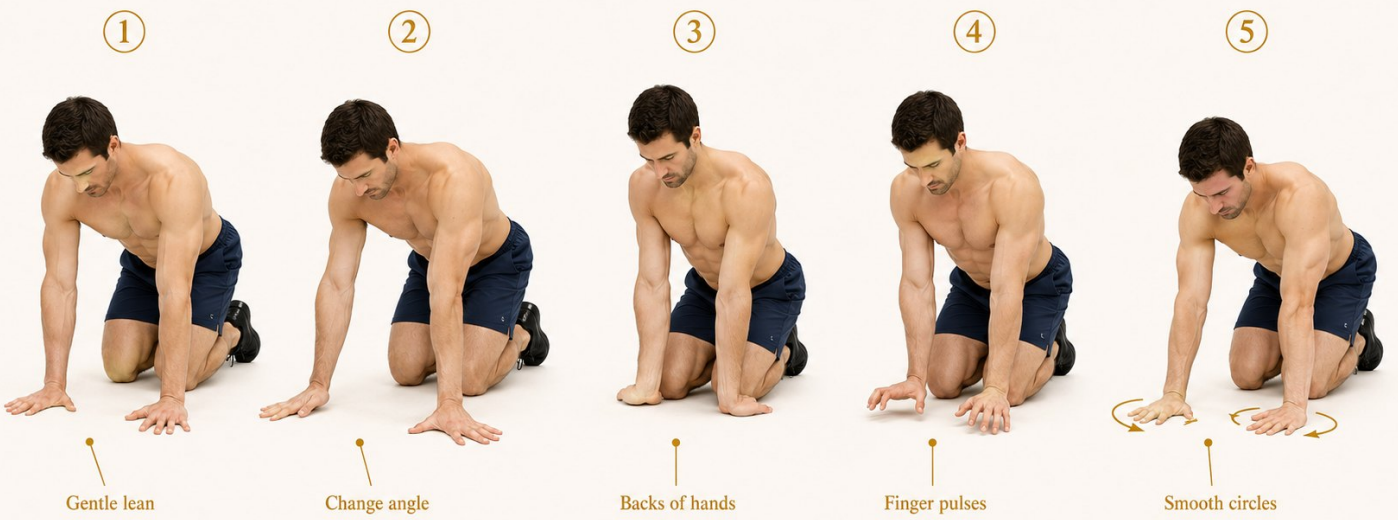
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Transition to the next part

Part VI now turns the prepared human system into a phase-by-phase atlas. Each moment of the skill has its own event definition, failure signature and correction decision.

HS-FIG-039 | Wrist Warm Up Series

FIGURE 39 | Wrist Warm-Up Series



A graded wrist warm-up helps prepare the hands and wrists for the extension demands of inverted support.

HS-FIG-040 | Wall Plank And Pike Load

FIGURE 40 | Wall Plank & Pike Load



Wall plank and pike-loading drills build the foundational shoulder and trunk support needed before full inversion.

HS-FIG-041 | Box Handstand Progression

FIGURE 41 | Box Handstand Progression



Box handstand progressions build shoulder support, stacking awareness and confidence before full inversion.

HS-FIG-042 | Wall Walk Progression

FIGURE 42 | Wall Walk Progression



Wall walks teach inversion entry, shoulder loading and line control through a graded climb to vertical support.

HS-FIG-043 | Chest To Wall Handstand Hold

FIGURE 43 | Chest-to-Wall Handstand Hold



The chest-to-wall hold teaches vertical stacking, active shoulder support and efficient line organisation.

HS-FIG-044 | Shoulder Tap And Weight Shift Drills

FIGURE 44 | Shoulder Tap & Weight-Shift Drills



Weight-shift and shoulder-tap drills develop unilateral support control, balance tolerance and handstand confidence.

HS-FIG-045 | Serratus Wall Slide Overhead Shrug Drill

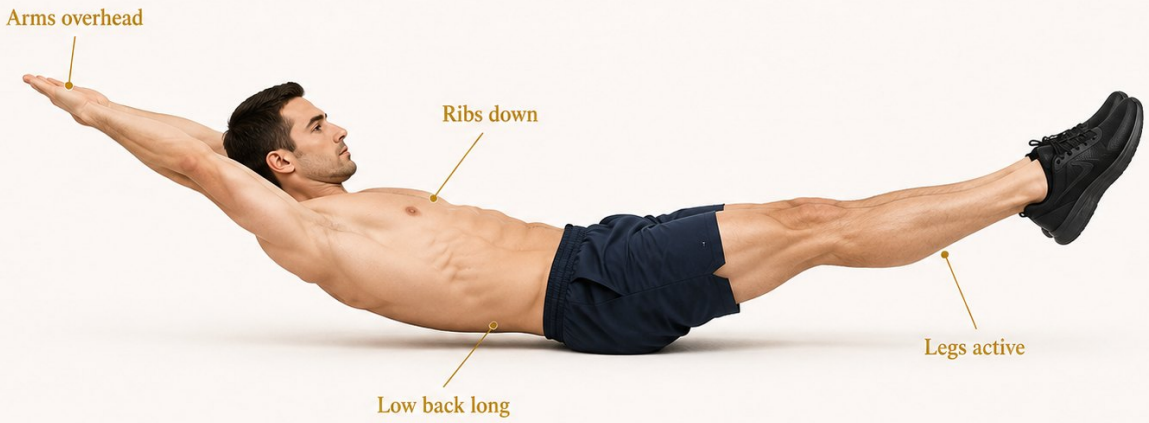
FIGURE 45 | Serratus Wall Slide / Overhead Shrug Drill



Serratus-focused wall slides and overhead shrugs help prepare the shoulder girdle for active inverted support.

HS-FIG-046 | Hollow Body Hold

FIGURE 46 | Hollow-Body Hold



The hollow-body hold builds trunk stiffness and line control that transfer directly to organised handstand positions.

HS-FIG-047 | Pike Compression Lift Seated Compression

FIGURE 47 | Pike Compression Lift / Seated Compression



Pike compression drills strengthen active hip flexion and trunk control, both essential for press-to-handstand preparation.

HS-FIG-048 | Shoulder Flexion Mobility Test Position

FIGURE 48 | Shoulder Flexion Mobility Test Position



Shoulder-flexion testing helps identify whether overhead range is sufficient for efficient handstand stacking.