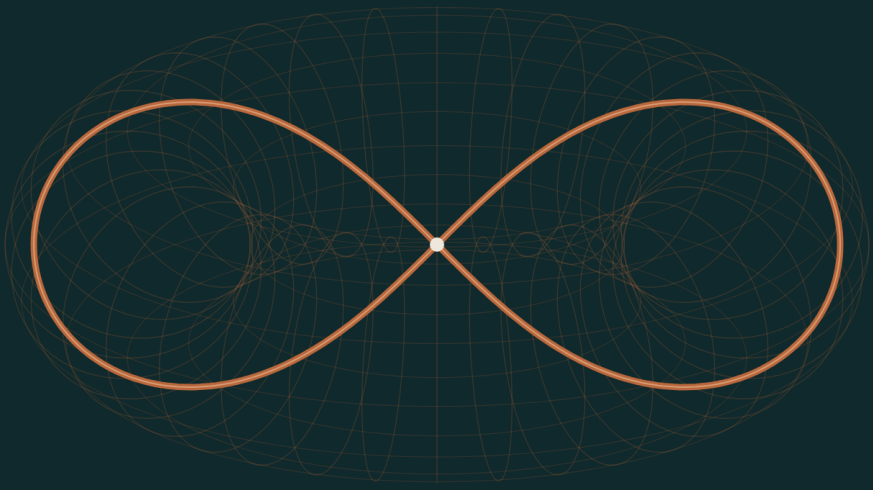
BOOK 2 · COMPANIONS TO THE SYSTEM OF INEVITABILITY



Wave *and* Return

THE BENT FIST, THE FIGURE-EIGHT, AND THE SCIENCE OF A RESTRAINED HAND

An evidence-based companion to the System of Inevitability

COMPILED BY CORY MATTHEW SNELL

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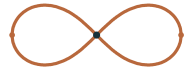

An evidence-based companion to the System of Inevitability

BOOK 2 OF THE COMPANIONS TO THE SYSTEM OF INEVITABILITY

COMPILED BY CORY MATTHEW SNELL

System of Inevitability originated by Uki (@ukigigi)
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Wave and Return: The Bent Fist, the Figure-Eight, and the Science of a Restrained Hand *Book 2 of the Companions to the System of Inevitability*

Compiled by **Cory Matthew Snell**. The System of Inevitability was originated and developed by **Uki (@ukigigi)**, stonemason and martial artist.

First edition, November 2026. Also in this series: Book 1, *Walking and Turning: Iron, Spirals, and the Science of a Practicing Mind*; Book 3, *Shape and Choice: Everyday Geometry, Calm Presence, and the Science of a Choosing Mind*; Book 4, *Lens and Lattice: Altered Perception, the Internal Arts, and the Science of a Curious Practice*; and Book 5, *Nucleus and Orbit: Atoms, Necessity, and the Science of an Interwoven Practice* (all 2026), released under the same license.

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Independence notice. This is an independent, unofficial work. It is not written, reviewed, or endorsed by Uki, and it does not speak for him. Descriptions of the System of Inevitability's striking methods are drawn from a project document that consolidates a May 2026 conversation about the system, and from an October 2026 viability assessment. Where this book suggests progressions, tests, stop rules, or ethical guidelines, those are the compiler's suggestions based on the general scientific literature, not Uki's teaching.

Health and safety notice. This book is for education and inspiration. It is not medical, legal, or self-defence instruction, and it does not replace a physician, physiotherapist, qualified coach, or lawyer. Striking hard objects can fracture the hand and damage the wrist. Striking people can injure, disable, or kill them. Consult a qualified professional before you begin, especially if you have any hand, wrist, elbow, shoulder, heart, bone, or nerve condition. You train at your own risk, and you alone are responsible for how you use what you learn.

About the science. Every study cited here was checked against its published record (authors, year, journal, and DOI) at the time of writing. No study, number, or quotation has been invented. Where the evidence is thin or absent, the text says so.

For the ones who could have struck and chose not to.
And for every training partner who trusted someone else's hands with their face.

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How to Read This Book

If you have read *Walking and Turning*, the first book in this series, you already know the promise this book makes: it will tell you, at every important turn, *how sure we are*.

That promise matters even more here. The first book was about juggling iron and spinning a ring on a bar. This one is about the hand as a striking tool, the wave of the body behind it, and close-range fighting. That is a subject where myths are everywhere, where confident claims are cheap, and where being wrong can hurt someone. So you will again see three kinds of marked boxes:

> ● EVIDENCE: WELL-ESTABLISHED
>
> **Well-established.** Supported by multiple independent studies, systematic reviews, or meta-analyses with reasonably consistent results, or by basic physics that is not in dispute. You can lean on these.

> ◐ EVIDENCE: SUGGESTIVE · EMERGING
>
> **Suggestive or emerging.** Supported by real peer-reviewed research, but the studies are few, small, short, indirect, or debated. Promising, but hold them loosely.

> ○ PRACTITIONER EXPERIENCE · PHILOSOPHY
>
> **Practitioner experience and philosophy.** Ideas, claims, images, and experiences from the System of Inevitability or from other martial traditions that have not been directly measured. They may be true and useful. They have not been tested.

And the box you should never skip:

> ⚠ CAUTION
>
> **Caution.** Practical safety information. A fist is a small bundle of fragile bones. A head is not designed to be struck. Read these.

Citations appear as author and year, for example (McGill et al., 2010). The full list, with journal details and DOIs, is in the References at the back. A sentence that makes a factual claim with no citation and no box is the compiler's reasonable summary or opinion. When this book draws on research already discussed in Book 1, it says so, so that the two books can be read together.

A word about the words. The System of Inevitability describes itself in a rich vocabulary: *toroidal energy fields*, *butterfly-flutter resonance*, *fractal kinetic chaining*, *psychological inevitability*, a *living club*. This book honours that vocabulary as what it is: the images a practitioner uses to organize movement and intention. It does not treat those images as physics. Wherever such a phrase appears, the text explains the ordinary, measurable mechanics that may sit underneath it: momentum, angular velocity, effective mass, elastic energy, timing. Where no study has measured a claim, it is labelled untested, however good it sounds.

A word about the phrase "upgrade in human consciousness." In Book 1 this phrase was treated as an inspirational theme rooted in attention, learning, and flow. In this book it takes on a second, sharper meaning. A person who learns to strike well has acquired a capacity to harm. The upgrade this book cares about is the one that comes *with* that capacity: more self-control, more awareness, better judgement, and a deeper commitment to never using force when anything else will do. That is not a metaphysical claim. It is an ethical one, and it is the centre of this book.

Foreword

"No instructors required. No belts. Just the tools, the physics, and the will to train."

— FROM THE SYSTEM OF INEVITABILITY PROJECT MATERIALS

The first book in this series ended with an image of a spiral turning outward: one person practising patiently in a backyard, and that patience spreading to others. This second book begins somewhere harder.

The System of Inevitability is, among other things, a martial system. Its creator, Uki, developed with his iron balls and spinning ring bar a set of tools for building strong hands, resilient wrists, calm attention, and whole-body coordination. He also developed a way of striking at close range: a hooked, bent-wrist fist borrowed from Southeast Asian Silat; a wave of motion that travels from the ground through the body and out through the knuckles, the hammerfist, the forearm, the elbow, and the shoulder; and a single-arm sequence of strikes that loops in a tight figure-eight and returns to its beginning. The project materials call this sequence a micro-vortex.

When the owner of this project asked for a second book, I faced a choice. I could write a manual of hitting, or I could write the kind of book the first one was: an honest companion that takes a practitioner's ideas seriously, sets them beside the best available peer-reviewed science, marks clearly what is known and what is not, and tries to make the reader wiser as well as more capable.

I chose the second, for three reasons.

The first is honesty. The science of striking is real and fascinating: whip physics, the proximal-to-distal sequencing of throwing and punching, the "double peak" of muscle activation in elite fighters, the effective mass behind a blow, the buttressing structure of the human fist. But almost none of it has been applied to the specific methods of this system. Many of the system's most strik-

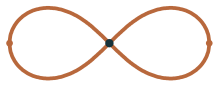
ing claims have never been measured. A companion that pretended otherwise would betray the reader and the originator.

The second is safety. The hand is a remarkable but fragile structure. Hand and wrist injuries are among the most common injuries in boxing and martial arts. A book that inspired someone to bend their wrist sharply and pound a steel-armed dummy before they were ready would be doing harm.

The third is the reason this series exists at all. The owner of this project wants these books to help ordinary people become more awake, more skilful, and kinder. A striking art can do that. The evidence on martial arts and well-being is encouraging, though mixed, and the best evidence suggests that *how* an art is taught, and what it values, matters enormously. A striking art taught without restraint can make people worse. So this book puts ethics where it belongs: in the middle, not in a footnote.

Read it slowly. Train even more slowly. And if what you learn here ever tempts you toward violence that isn't strictly necessary, put the book down and walk.

Cory Matthew Snell, compiler November 2026



Part I · The Hand

A hand that can close into a fist is a hand that can also open.

CHAPTER 1

An Invitation to Restraint



The strongest hand in the room is the one that does not need to strike.

Make a fist. Slowly.

Notice what happens. Your fingertips curl into your palm and press there. The middle segments of your fingers fold down and lock. Your thumb swings across and clamps over the index and middle fingers. Tendons that run from your forearm through the narrow tunnel of your wrist draw tight. Your forearm hardens. If you pay attention, you may feel your shoulder and even your breath change a little, as if the body as a whole were getting ready for something.

Now open it again, just as slowly.

That small cycle, closing and opening, is the subject of this book. The closing is the obvious part: how a fist is built, how force travels through it, how a wave of motion from the ground can be focused into a few square centimetres of knuckle, forearm, or elbow. The opening is the less obvious part, and the more important one: the relaxation that makes speed possible, the calm that makes good decisions possible under pressure, and the moral choice to keep the hand open whenever you can.

Where this book fits

This is the second book in a series of free, independent companions to the **System of Inevitability**, a solitary training method developed by Uki (@ukigigi), a stonemason and martial artist. The first book, *Walking and Turning*, looked at the system's conditioning tools: three six-pound iron balls juggled in the Cascade, the Mills Mess, and the Box; a five-foot, twenty-five-pound steel bar carrying a spinning two-pound iron ring; and the philosophy that "training method is just walking and turning." It set those tools beside the science of brain plasticity, motor learning, tendon and muscle adaptation, flow, and mood.

This book turns to the other half of the system: what the project materials call its close-quarters striking architecture. That includes:

- the **"J" fist**, or bent fist, a clenched fist held with the wrist sharply flexed, drawn from the *Monyet* ("monkey") hand of Southeast Asian Silat;
- **whole-body wave energy**, a pulse of compression and release that travels from the ground or core through the body and is "cycled" through every striking surface: bent knuckles, hammerfist, forearm, elbow, and shoulder;
- **figure-eight, toroidal, and helical geometry** as the organizing image of movement;
- a **single-arm micro-vortex**: a bent-fist punch, an elbow to the same spot, a backward hammerfist, a lateral elbow, and a return to the punch, all in one tight loop;
- **"rock in a sock"** delivery: a relaxed, whip-like swing that locks only at impact;
- a **metal-armed training dummy** and a **freestanding heavy bag**; and
- **breath synchronization**, with acknowledged parallels to the Russian art of Systema.

The book takes each of these seriously. For each one, it asks three questions. What does the system claim? What does peer-reviewed science say about the mechanics underneath? And what has not yet been tested, and how could it be?

What this book is not

It is not a fighting manual. It will not teach you to hurt anyone, and it will spend a whole chapter on why, when, and whether you ever should.

It is not an endorsement of every claim in the source material. The materials that describe the system are enthusiastic. They describe a "living geometric engine for close-quarters dominance," energy economy "approaching 100%," a fist that is "structurally superior" to the conventional one, and "4–5 stacked impacts in under one second." Some of these may turn out to be partly true. None of them has been measured. This book will say so each time, and then suggest how someone could find out.

It is not the last word. The science of striking is young, and the science of this particular system does not yet exist. The project's own viability assessment of October 2026 judged the method *conditionally viable as personal conditioning* and *not yet viable as a fully transmissible system* until it has progressions, filmed standards, and outcome data. That is an honest place to begin, and it is where this book begins.

An untested claim is not a false claim. It is an invitation to test.

The two kinds of strength

A striking art builds two kinds of strength at once, and they pull in opposite directions.

The first is the strength to act: fast hands, a sturdy wrist, a body that moves as one piece, the ability to produce a sharp, heavy impact at close range. Most of this book's science is about that kind of strength, because that is where the research is: in biomechanics, motor learning, and exercise physiology.

The second is the strength to refrain: to notice fear and anger without being driven by them, to read a situation accurately, to choose the least harmful option, to walk away, and to protect the people who train with you. This kind of

strength is harder to measure, but it is not beyond science. There is real research on how martial arts training relates to aggression and wellbeing, on how people perform under stress, on de-escalation, and on the attention and self-regulation that mindfulness and breath training can build. That research is mixed in places, and this book reports the mixture honestly. But one thread runs through it clearly: *what* a training culture values seems to matter as much as what it trains.

The phrase that inspires this series is "an upgrade in human consciousness." In a book about striking, this book can give that phrase only one honest meaning. It is the upgrade from being *able* to hurt to being *trustworthy* with that ability.

How the book is arranged

Part I, The Hand, introduces the system's striking ideas as the project materials describe them (Chapter 2), and then looks closely at the bent fist: what anatomy and biomechanics say about wrist position, grip, the buttressed fist, and hand injury (Chapter 3).

Part II, The Wave, explores the physics and physiology of whole-body striking: the whip and the kinetic chain (Chapter 4), relaxation, stiffness, and effective mass (Chapter 5), the figure-eight micro-vortex and how coordination patterns switch (Chapter 6), and breath (Chapter 7).

Part III, The Learning, turns to how such skills are learned: the science of variable, "non-repetitive" practice (Chapter 8), perception and timing against a living opponent (Chapter 9), and calm under pressure (Chapter 10).

Part IV, The Responsibility, holds the most important chapters: the ethics of the closed hand (Chapter 11), a suggested safe progression for the bent fist and the micro-vortex (Chapter 12), and a practical guide to testing the system's claims honestly (Chapter 13). A short closing chapter, test protocols, an evidence summary, a glossary, and full references follow.

If you read only three chapters, read 11, 12, and 13.

> ⚠ CAUTION
>
> **Before you try anything in this book:** striking hard surfaces with a bent wrist is a recognized way to injure the hand and wrist. Chapter 12 gives a conservative, staged progression and stop rules. Do not skip to the metal-armed dummy.

CHAPTER 2

The Shape of the System



Defense and offense are indistinguishable; energy is recycled internally.

— FROM THE SYSTEM OF INEVITABILITY PROJECT MATERIALS

Before testing any idea, it is only fair to state it as its holder would. This chapter describes the System of Inevitability's close-range striking ideas as they appear in the project materials, a consolidation of a detailed conversation about the system held in May 2026. Analysis and evidence come in later chapters. Here, the aim is to listen.

A system of flow, not of techniques

The project materials describe the System of Inevitability as a solitary, principle-based martial synthesis optimized for **close-quarters combat**, the range from zero to about two feet, sometimes called infighting. Rather than a catalogue of separate techniques, it treats combat as "continuous, self-sustaining flow."

Its stated foundations are:

- natural biomechanics and everyday human movement, with "no exotic stances";
- applied geometry, especially **figure-eight infinity loops**, **toroidal** (doughnut-shaped) **energy fields**, and **helical spirals**;
- fluid-dynamic images: "butterfly-flutter micro-vibrations," vortices, and wave propagation;

- **non-repetitive, fractal kinetic chaining**, meaning that combinations are not memorized but generated afresh from underlying patterns; and
- influences from Silat (the *Monyet* or "J" hand), from Systema-style wave and relaxation principles, and from what the materials call predatory archetypes.

The intended result is that defence and offence become indistinguishable, energy is "recycled internally," and the practitioner "imposes geometry on the opponent rather than meeting force with force." The name of the system comes from a feeling this is meant to produce: outcomes that seem *inevitable* because they emerge from universal patterns rather than from memorized forms.

The "J" fist

The signature tool is the **"J" fist**, or bent fist. It is a clenched fist held with extreme *palmar flexion*: the wrist bent sharply downward toward the palm, so that hand and forearm form a hook, like a candy cane or the letter J. The materials link it to the *Tangan Monyet*, the monkey hand, of Silat lineages such as Cimande and Serak.

In this position, the materials say, the pinky edge of the fist, the ulnar border of the forearm (the side on the little-finger side), and the elbow form a single continuous striking surface, a "living club." The wrist lock is said to align the bones for force transmission and protect against hyperextension. The same structure can hammer, chop, slash, hook, and trap, and at close range it allows control of an opponent's arm or neck at the same time as striking.

The materials go further and argue that the bent fist is *superior* to a conventional straight fist for close-quarters work, for four reasons: structural integrity under misaligned impact; better "wave transmission" through a short lever and whip-like swing; seamless chaining between fist, hammerfist, forearm, and elbow without resetting; and compactness in entanglement. The straight fist, on this view, is optimized for longer range and discrete strikes.

The wave

At the centre of the system is **whole-body wave energy**: a helical pulse of compression and release that originates from the ground or core, travels through the kinetic chain, and then recycles. At close range the wave "collapses into micro-waves."

The wave can be cycled through every striking surface in turn: the bent knuckles, the hammerfist, the forearm, the elbow, and the shoulder. On a freestanding heavy bag, from a stationary rooted position, these surfaces string together "like alternating juggling patterns." The practitioner does not pre-plan the sequence. The geometry and the feedback from the bag generate the patterns on the fly.

Readers of *Walking and Turning* will recognize the family resemblance. The juggling patterns of Book 1 (the cascade, the Mills Mess, the Box) are cycles in which each hand's action creates the conditions for the next. The system's striking work is described in the same terms: not a list of strikes, but a pattern that keeps itself going.

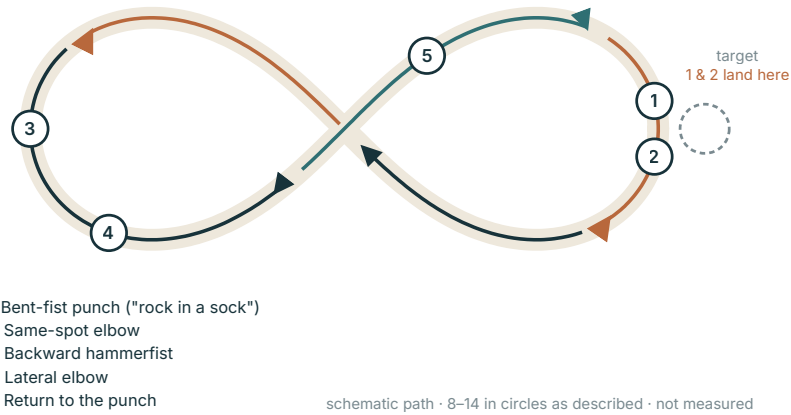
The micro-vortex

The materials describe one specific sequence in detail, which they call the **single-arm micro-vortex**. It uses one hand and elbow, moving in small circular pathways of about 8 to 14 inches:

1. **A straight bent-fist punch**, delivered with a relaxed, whipping "rock in a sock" swing that locks into the J shape only at impact.
2. **A same-spot elbow**: the hand opens, the wrist snaps into extreme flexion, and the elbow springs outward and upward to strike the exact point the fist just hit.
3. **A backward hammerfist**: the elbow's rebound reverses the momentum into a backward or diagonal hammerfist, again with a whipping quality.
4. **A lateral elbow**: the momentum switches again into a tight sideways elbow snap.
5. **A natural return** to the straight punch, and the cycle restarts.

One continuous helical wave is said to power the whole cycle. The momentum switches trace "an oscillating toroidal figure-8 within the small circle," and the J-shaped wrist acts as a "universal adapter" between surfaces. The materials describe the result as **"4–5 stacked impacts in under one second"** on or near the same target, "with compounding resonance and no resets," and say the sequence feels automatic once the wave is initiated. It is trained from a stationary, rooted position.

The single-arm micro-vortex



The single-arm micro-vortex as described in the project materials, drawn as a schematic path. Stations: (1) bent-fist punch, (2) same-spot elbow, (3) backward hammerfist, (4) lateral elbow, (5) return. The figure-eight is a description of the path's shape, not a measurement.

Tools and training

Two tools carry this part of the system:

- a **wooden training dummy with Schedule 40 steel-pipe arms**, built on the pattern of the Wing Chun *mook yan jong*, providing "hard, unyielding feedback" for alignment, wrist lock, rebound, and conditioning of the striking surfaces; and

- a **freestanding heavy bag**, worked from a stationary rooted position, whose rebound assists the momentum switches and builds endurance and instinctive adaptation.

The suggested progression in the materials is slow wave → single-arm vortex → full multi-limb "juggling," with breath synchronized to the movement: inhale on compression, exhale on release.

Systema as a parallel path

The materials present Russian Systema as a "parallel path up the same mountain." Both are described as emphasizing non-repetitive flow, natural movement, wave and relaxation principles, and energy recycling. Systema is characterized as breath- and relaxation-centred; Inevitability as more explicitly geometric, with compact J-hand tools for short-range work. Each is said to be able to enrich the other.

A note on ratings

The source conversation also includes numerical ratings: the dummy setup at 9.2 out of 10, the system as a concept at 9.4 and later 9.6, and a 9.1 comparison with elite military close-quarters systems. These numbers came from a conversation with an AI system. They are impressions, not measurements. No one tested anything to produce them, and they are not evidence that the system works, or that it doesn't. This book mentions them once, here, for completeness, and does not rely on them. Chapter 13 explains what real evidence would look like.

To its credit, the same conversation noted that full viability "requires progressive pressure-testing, filmed standards, and outcome data." That is exactly right, and it is where Part IV of this book will take us.

> ○ PRACTITIONER EXPERIENCE · PHILOSOPHY
>
> **What this chapter contains.** Everything above is the system's own description of itself, from its project materials. None of it is a scientific finding. The rest of this book asks, claim by claim, what science can say about it.

CHAPTER 3

The Bent Fist



A fist is a structure. Structures have strengths, and they have limits.

The human hand has 27 bones, more than a dozen joints in the fingers alone, and tendons that run from muscles in the forearm across the wrist to every finger. It evolved, as far as anyone can tell, mostly for manipulation: gripping, carrying, shaping, throwing, making. It can also be folded into a fist. What happens to a fist when it strikes something is a question that biomechanics, hand surgery, and even evolutionary biology have studied. This chapter gathers what they have found and sets it beside the System of Inevitability's signature hand, the bent or "J" fist.

How a fist holds together

When you close a conventional fist, the tips of the four fingers press into the palm, the middle segments fold down, and the thumb wraps across the index and middle fingers. The anatomists Michael Morgan and David Carrier called this arrangement **buttressing**: each part props up the others so that the whole fist behaves less like a bundle of separate bones and more like a single block.

They tested it. In one set of measurements, the buttressed fist made the second knuckle joint about **four times stiffer** than an unbuttressed one, and force transfer through the thumb more than doubled the ability of the finger bones to transmit punching force. Interestingly, in the same study, peak forces from maximum-effort strikes did not differ between the closed fist and the open

palm (Morgan & Carrier, 2013). A follow-up experiment on cadaver arms measured strain in the metacarpal bones (the long bones of the palm) during strikes. Strains were significantly higher with an unbuttressed fist or an open-hand slap. The authors estimated that a person could safely strike with about 55% more force with a fully buttressed fist than with an unbuttressed one, and about twice as much as with an open-handed slap (Horns et al., 2015).

Morgan and Carrier went on to argue that the human hand's proportions evolved partly *for* fighting. That evolutionary interpretation has been challenged by other scientists, who point out that a useful feature is not proof that it was selected for that use (Nickle & Goncharoff, 2013). For our purposes, the mechanical findings matter more than the evolutionary story, and they are clear: **how the fist is formed changes how well its bones are protected**.

> ◐ EVIDENCE: SUGGESTIVE · EMERGING
>
> **Fist structure protects the hand.** Laboratory and cadaver studies show that a tightly buttressed fist stiffens the knuckle joints and reduces strain in the metacarpal bones compared with loose or open-hand positions (Morgan & Carrier, 2013; Horns et al., 2015). These are small studies under laboratory conditions; the evolutionary interpretation is debated (Nickle & Goncharoff, 2013). None of these studies tested a bent-wrist fist.

What the wrist does

The fist is only half the structure. Every force that lands on the knuckles must pass through the wrist into the forearm, and the wrist is a complicated joint: two rows of small carpal bones, a web of ligaments, and, on the little-finger side, a cartilage cushion between the forearm's ulna and the carpals.

Two well-studied facts about the wrist bear directly on the bent fist.

First, wrist position strongly affects grip strength. When people squeeze as hard as they can, they naturally settle into about 35 degrees of wrist *extension* (bent backward) and slight ulnar deviation (toward the little finger). In a classic study, grip strength was significantly lower in *any* position that deviated from this self-selected one, and a minimum of about 25 degrees of extension was

needed for optimum grip (O'Driscoll et al., 1992). Earlier work had likewise studied how sideways deviation of the wrist affects maximum power grip (Pryce, 1980). The reason is well known to anatomists: the long finger flexor muscles cross the wrist, and when the wrist is flexed they are shortened and slack, so they cannot pull as hard on the fingers.

The J fist places the wrist in *extreme flexion*, the opposite direction from the strongest grip. No study has measured grip strength or fist integrity in that exact posture, but the direction of the effect is not in doubt: flexing the wrist weakens the clench. A fist that clenches less tightly is, according to the buttressing research above, a fist whose bones are less well protected.

Second, wrist position affects the pressure inside the carpal tunnel, the narrow passage through which the finger tendons and the median nerve run. In a study that measured carpal-tunnel pressure continuously as people moved their wrists, the lowest pressure was found near neutral: on average about 2 degrees of extension and 2 degrees of ulnar deviation (Weiss et al., 1995). Holding the wrist far from neutral raises the pressure on the structures inside.

● EVIDENCE: WELL-ESTABLISHED

Wrist position matters. Maximum grip strength occurs with the wrist moderately extended and drops when the wrist moves away from that position, including into flexion (O'Driscoll et al., 1992). Carpal-tunnel pressure is lowest near neutral (Weiss et al., 1995).

What does that mean for the J fist? Not that it is useless, but that its value cannot come from *maximum grip*. If it has advantages, they must come from somewhere else: from changing which surface lands, from aligning the forearm bones behind a different contact point, from making transitions to the hammerfist and elbow quicker, or from protecting the wrist from being bent *backward* on impact, which is a real mechanism of injury in punching. Those are interesting hypotheses. They are hypotheses.

Surfaces and pressure

The project materials describe the J fist as turning the pinky edge of the fist, the ulnar border of the forearm, and the elbow into one continuous "living club." It is a vivid image, and it points to something physical: different surfaces of the arm have very different areas, and the same force spread over a smaller area produces higher pressure.

One study scanned the contact areas of the fist, the palm, and the elbow in 76 adults in striking positions. In both men and women, the palm had the largest contact area and the elbow the smallest (Beranek et al., 2022). A study of trained self-defence practitioners striking a force plate from a dominant ground position found that palm strikes and elbow strikes produced *higher* peak forces than straight punches, and estimated that men could exceed a force associated with skull fracture with a substantial probability using elbows and palms in that position (Beranek et al., 2020). A forensic study of 50 ordinary volunteers compared the fist, the little-finger edge of the hand (a "karate chop"), and the open hand, and found that the forces depended on technique, sex, hand, and body weight, with large differences between individuals (Adamec et al., 2021).

These studies were not about the J fist. But they support two sober observations. Short, compact strikes with the hard, narrow surfaces of the forearm and elbow can be very forceful. And because those surfaces are small and hard, they concentrate pressure on whatever they hit, which is one reason elbow strikes are restricted or banned in many combat sports. Chapter 11 returns to what that means ethically.

The hand that breaks

the most important fact about the fist for anyone who trains it is this: **in elite amateur boxing, the hand is the most commonly injured part of the body.**

In five years of medical surveillance of the Great Britain amateur boxing squad, more injuries affected the hand than any other location, in both training and competition (Loosemore et al., 2015). A longer study of the same programme found that instability of the finger joints at the base of the hand and "boxer's knuckle," an injury to the tissues over the knuckle, were the most com-

mon hand and wrist diagnoses (Loosemore et al., 2017). These were elite athletes, with expert coaching, hand wraps, and gloves.

Outside the ring, the classic hand injury from punching is the **boxer's fracture**, a break of the neck of the fifth metacarpal, the bone behind the little-finger knuckle, caused by direct trauma to a clenched fist (Hussain et al., 2020). In the United States, metacarpal fractures are most common in young men, and the most common mechanisms are contact with a wall or door, and falls (Nakashian et al., 2012). The fifth metacarpal is exactly the bone that sits behind the "pinky edge" of the fist that the J fist emphasizes.

In a survey of martial artists, the hand and wrist were the most commonly injured region of the upper body, fractures and dislocations were frequently reported, and hand protection was associated with a lower risk of hand injury (Diesselhorst et al., 2013). A review of hand and wrist injuries in boxing and martial arts concluded that axial loading of the fist causes fractures and dislocations in striking arts, that hand protection clearly reduces risk, and that training in proper technique and target selection is an important part of prevention (Drury et al., 2017).

● EVIDENCE: WELL-ESTABLISHED

Hands break. Hand and wrist injuries are the most common injuries in boxing, even at elite level, and are common in martial arts. Hand protection and good technique reduce the risk (Loosemore et al., 2015, 2017; Diesselhorst et al., 2013; Drury et al., 2017).

⚠ CAUTION

The bent fist is untested for injury risk. No published study has examined injuries from striking with a sharply flexed wrist. Until such evidence exists, treat the J fist as a *higher-risk* position for the wrist, not a protective one, and follow the progression in Chapter 12: no hard targets until the wrist has been conditioned for months, light contact first, and immediate stopping at any sharp pain, swelling, numbness, or knuckle that looks or feels different.

The monkey hand and its lineage

The project materials trace the J fist to the *Tangan Monyet*, the monkey hand of Silat, the family of Southeast Asian martial arts practised across Indonesia, Malaysia, and the wider Malay world. Silat is a rich subject of scholarship in anthropology and ethnomusicology. An edited academic volume has examined pencak silat's history, standardization, and the music that traditionally accompanies it (Paetzold & Mason, 2016). An anthropological study of Sundanese pencak silat in West Java described how students learn to improvise by mastering generic principles from which "potentially unbounded repertoires" of responses are generated, and contrasted this with nationally standardized, more fixed forms (Wilson, 2009). That observation will matter again in Chapter 8, because it describes, in a scholarly setting, exactly the kind of principle-based, non-repetitive learning the System of Inevitability claims for itself.

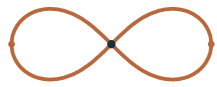
This book could find no peer-reviewed biomechanical study of the monkey hand or of any bent-wrist striking posture. The lineage claims in the materials (Cimande, Serak) are the system's own account of its influences, and they are offered here as that.

> ○ PRACTITIONER EXPERIENCE · PHILOSOPHY
>
> **The J fist's claimed advantages are untested.** The claims that the bent fist is "structurally superior" to the straight fist, that its wrist lock "aligns bones for force transmission," and that it is ideal for continuous close-range chaining come from the system's own materials. They are plausible as hypotheses about *transitions* and *surfaces*. They are in tension with what is known about wrist position and grip. They have not been measured. Chapter 13 suggests how to measure them.

A fair summary

The bent fist is not obviously wrong. Martial traditions all over the world use strikes with the edge of the hand, the forearm, the back of the wrist, and the elbow, and several of those surfaces are forceful at close range. A hand shape that makes it easy to flow between them could genuinely help a practitioner who trains that way.

But "superior" is a strong word, and the evidence we do have points to real costs: a flexed wrist weakens the grip that buttresses the fist, raises pressure in the carpal tunnel, and leaves the vulnerable fifth metacarpal in the front line. If the J fist is to earn its place, it will have to do so in tests that compare it honestly with the conventional fist, on the same target, with the same person, filmed and measured. Until then, the best word for it is not *superior* or *inferior*, but *interesting*.



Part II · The Wave

Ground to hip, hip to shoulder, shoulder to hand. A wave that begins far from where it lands.

CHAPTER 4

The Whip and the Wave



A wave that can be cycled endlessly through every striking surface.

— FROM THE SYSTEM OF INEVITABILITY PROJECT MATERIALS

Crack a towel. If you have ever done it, you know the trick is not to swing hard with the hand. It is to move the hand sharply and then *stop* it, letting the motion run down the length of the towel faster and faster until the tip snaps. The hand starts the wave. The towel finishes it.

The System of Inevitability describes its striking power in the language of waves: a "helical compression-release pulse" that begins in the ground or core, travels through the body, and is delivered through the knuckles, hammerfist, forearm, elbow, or shoulder. The materials describe the arm in the strike as "rock in a sock": relaxed and flail-like during the swing, locking only at impact. This chapter looks at what physics and biomechanics know about exactly this kind of motion, because, as it happens, they know quite a lot.

The proximal-to-distal sequence

Watch a baseball pitcher, a tennis server, a javelin thrower, or a boxer throwing a long punch in slow motion, and you will see a pattern. The big, heavy segments near the centre of the body start moving first: the legs push, the hips rotate, then the trunk. The lighter segments farther out (the upper arm, the forearm, the hand) start later, but reach higher speeds. Each segment seems to hand its motion on to the next.

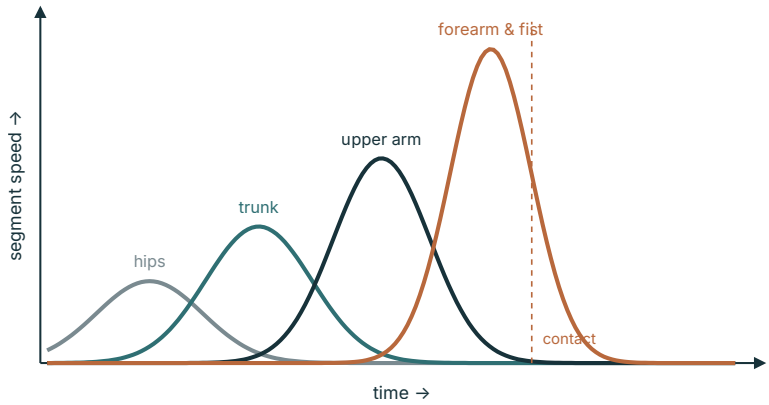
Biomechanists call this **proximal-to-distal sequencing**, and it is one of the most consistent findings in the science of throwing, kicking, and striking. A classic review showed that the motions of body segments in these skills are generally sequenced from the centre outward, and explained why: the segments are linked, so the motion of one segment produces forces on the next. When the upper arm accelerates forward, the forearm at first lags behind; then, as the upper arm's motion interacts with the forearm, the forearm whips forward, and its motion in turn slows the upper arm (Putnam, 1993). These "motion-dependent" interactions mean that a well-timed sequence lets the outer segments move faster than the muscles acting on them alone could make them move.

A study of skilled baseball players made the point in a striking way. Using a method that separates the torque a muscle produces at a joint from the torque transmitted to it by the motion of other segments, it found that throwers generated large angular velocities at the shoulder, elbow, and wrist largely by exploiting these **interaction torques**. To throw faster, they increased muscle torque at the trunk and shoulder, *but not at the elbow and wrist*. The proximal muscles created "a dynamic foundation" for the whole limb (Hirashima et al., 2007).

The traditional picture has also been refined. A review of the tennis serve and squash forehand showed that twisting rotations along the long axis of the upper arm and forearm reach their peak speeds late in the stroke and are essential to racquet speed. Simple "centre-outward" sequencing was not enough to describe what was happening (Marshall & Elliott, 2000). The body's chain is not just a chain of hinges; it is a chain of spirals.

In an analysis of the overarm throw in 56 handball players, nearly three quarters of the work done on the ball was done in the last 50 milliseconds of the throw, and the authors described a "flow of energy from proximal to distal segments" (Jöris et al., 1985).

Proximal to distal: the wave



ILLUSTRATIVE SHAPE ONLY — NOT MEASURED DATA

A schematic of proximal-to-distal sequencing. Each curve represents the speed of one body segment over time; the larger segments peak earlier and lower, the smaller segments later and higher. This is an illustrative shape based on the descriptions in Putnam (1993) and Hirashima et al. (2007), not measured data from any striking study.

● EVIDENCE: WELL-ESTABLISHED

The kinetic chain is real. In throwing, kicking, and striking, body segments are generally sequenced from proximal to distal, and skilled performers use the mechanical interaction between linked segments to generate high speeds at the hand. Long-axis rotations of the arm add to this (Putnam, 1993; Hirashima et al., 2007; Marshall & Elliott, 2000; Jöris et al., 1985).

Does this apply to punching? Partly. A punch is not a throw: the hand doesn't let go, and the goal is usually force on a target rather than maximum speed at release. But studies that have mapped the phases of boxing punches with force plates, muscle recordings, and high-speed video describe a similar flow from the ground through the hips and trunk to the arm (Lenetsky et al., 2020). A classic kinematic analysis of boxing punches likewise examined how the upper limb segments move during different punches (Whiting et al., 1988), and a review of the contributors to punching force highlights the role of ground reaction forces, the push of the feet against the floor (Lenetsky et al., 2013). The system's image

of a wave that begins "from the ground or core" is, in this sense, describing something real.

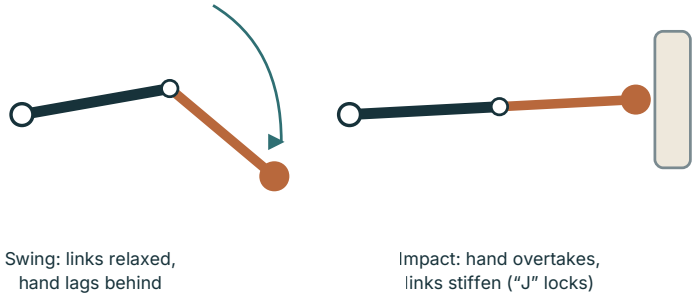
Whips, sockets, and rocks

Why does a whip crack? The answer has been worked out by applied mathematicians. A wave started at the handle travels down the whip, and because the whip tapers and is under tension, the wave speeds up as it travels, until the tip moves faster than sound and produces a small sonic boom (Goriely & McMillen, 2002; McMillen & Goriely, 2003). The handle never moves anywhere near that fast. The speed is produced by the *shape and flexibility* of the system, not by the force at the handle alone.

The human arm is not a whip. It is a chain of a few rigid segments with joints, not a flexible tapered cord. But it shares an essential feature: energy put in at the heavy end can be transferred to the light end and concentrated there, if the timing is right. Engineers have long modelled the golf swing, for example, as a **double pendulum**: two linked rods, the arms and the club, where a well-timed release of the wrist lets the clubhead overtake the hands (Pickering & Vickers, 1999).

"Rock in a sock" is a vivid name for exactly this: a heavy object at the end of a flexible link. In the micro-vortex, the "sock" is a relaxed forearm and wrist, and the "rock" is the fist or the forearm itself. If the wrist and elbow stay loose during the swing, the hand can lag behind and then whip through, picking up speed from the motion of the shoulder and upper arm, just as the forearm does in a throw.

"Rock in a sock": a double pendulum



A double-pendulum schematic of "rock in a sock" delivery. Left: during the swing, the forearm and hand lag behind the upper arm (relaxed links). Right: near impact, the distal segment overtakes and the links stiffen. Schematic only.

Springs in the body

There is a second source of "wave energy" that the body has and a towel does not: **elastic recoil**. Tendons and other connective tissues can store energy when they are stretched and return much of it when they recoil. The body uses these biological springs in running, jumping, and throwing (Roberts & Azizi, 2011). When a muscle is actively stretched just before it shortens, a pattern called the **stretch-shortening cycle**, it can produce more force and power than it would from a standing start (Komi, 2000).

The most dramatic example is throwing. Experiments with human throwers showed that our ability to throw fast depends on several anatomical features that let the shoulder store elastic energy as the arm is cocked back and release it as the arm whips forward. Those features appear together in the fossil record about two million years ago (Roach et al., 2013).

The project materials describe the wave as "compression-release." That is not a bad informal description of a stretch-shortening cycle: a loading phase in which tissues are tensioned, followed by a release in which they recoil. Whether

the specific movements of the micro-vortex use elastic recoil efficiently has never been studied. But the general principle that a body can store energy in a "wind-up" and return it in a "release" is solid.

● EVIDENCE: WELL-ESTABLISHED

The body stores and returns elastic energy. Tendons and connective tissue act as springs; the stretch-shortening cycle enhances force and power; human throwing relies on elastic energy storage at the shoulder (Roberts & Azizi, 2011; Komi, 2000; Roach et al., 2013).

What "wave energy" really means

It is worth slowing down here, because words matter.

In physics, a **wave** is a disturbance that carries energy from one place to another. A wave through the human body during a strike is a reasonable *metaphor* for what the kinetic-chain research describes: motion that starts in one place and arrives, amplified in speed, somewhere else. The underlying quantities are ordinary ones:

- **momentum**, the product of mass and velocity, which is what a strike delivers to a target;
- **angular velocity**, how fast each segment rotates, which is what the sequencing research measures;
- **interaction torques**, by which one moving segment drives the next;
- **elastic energy**, stored and released by tendons and connective tissue; and
- **effective mass**, how much of the body's mass is effectively "behind" the strike at impact (the subject of the next chapter).

None of these involve a "field." A **toroid** is a doughnut shape, and a path that loops around and returns, like the micro-vortex, can certainly trace something like a doughnut in space. That is geometry, and it may be a useful image for organizing practice. But there is no evidence that a human body generates a "toroidal energy field," and nothing in biomechanics requires one to explain how strikes work.

The same is true of "butterfly-flutter resonance" and "penetrating micro-vibrations." Resonance is a real phenomenon in physics: a system driven at its natural frequency oscillates with growing amplitude. But no study has shown that striking with a relaxed arm produces resonance in a target, or that micro-vibrations add meaningfully to the damage of an impact. In ordinary collision mechanics, the important quantities are the momentum delivered and how quickly it is delivered (Walker, 1975; Wilk et al., 1983). If the system's "flutter" corresponds to anything measurable, a high-speed camera and a force sensor could find it. Until then, it is an image.

> ○ PRACTITIONER EXPERIENCE · PHILOSOPHY
>
> **Toroidal fields, flutter, and resonance are metaphors.** The project materials' descriptions of "toroidal energy fields," "butterfly-flutter resonance," and "fractal" chaining are practitioner imagery. They may help organize movement and attention. They are not supported by physics or biomechanics research, which explains striking with momentum, angular velocity, interaction torques, elastic energy, and effective mass.

The physics underneath is wonderful enough. It does not need to be dressed up.

The wave, honestly told

Here, then, is what we can say with confidence. Skilled striking and throwing do use something like a wave: a timed sequence of segment motions from the centre of the body outward, exploiting the mechanical coupling between segments and the elasticity of tissues, so that the hand or elbow moves faster than the muscles acting on it could achieve alone. Relaxation of the outer segments during the swing is likely to help this, because a stiff, braced arm cannot be whipped. That is a real foundation for the system's wave.

And here is what we cannot yet say: whether the specific micro-movements of the System of Inevitability produce an efficient kinetic chain; whether a wave

can be “cycled endlessly” through successive surfaces without losing most of its energy each time; and whether the system’s strikes are faster, heavier, or more efficient than conventional ones. Those are questions for a camera, a force sensor, and patience.

CHAPTER 5

Loose Until It Lands



Relaxed during the arc; locked at impact.

— THE "ROCK IN A SOCK" PRINCIPLE, FROM THE PROJECT MATERIALS

There is a paradox at the heart of striking, and a group of researchers led by the spine biomechanist Stuart McGill put it plainly. When a muscle contracts, it produces force, which creates movement. But it also becomes *stiffer*, and stiffness resists rapid changes of shape and slows the joint down. Force makes you fast; stiffness makes you slow. How, then, does a fighter produce a strike that is both very fast and very heavy?

The double peak

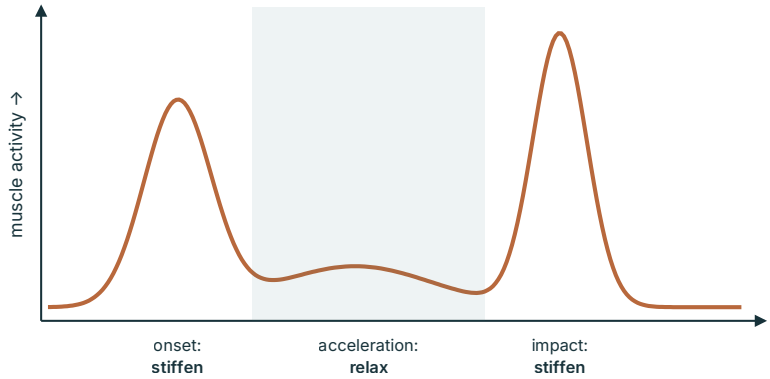
To find out, McGill and colleagues recorded the muscle activity and spine motion of five elite mixed martial arts fighters as they struck a heavy bag (McGill et al., 2010). In many of the strikes, the muscles showed not one burst of activity but two, a **double peak**:

1. A first peak at the very start of the movement, which the authors suggested stiffens the body's core and creates a stable base, "an inertial mass" for the limbs to "pry" against as they begin to move.
2. A phase of **relaxation**, in which some muscles switched off as the limb sped up.

3. A second peak at the moment of contact with the bag, which the authors proposed stiffens the whole body linkage, increasing the **effective mass** behind the strike and likely its force.

The authors described this as a "contract–relax–contract" pulse and suggested that training should pay attention not only to how fast a muscle can switch on but to how fast it can *switch off*.

The double peak



ILLUSTRATIVE SHAPE ONLY — AFTER THE PATTERN DESCRIBED BY McGILL ET AL. (2010)

A schematic of the "double peak" pattern described by McGill et al. (2010): muscle activity rises at movement onset, falls as the limb accelerates, and rises again at impact. Illustrative shape only, not recorded data.

Read that description again with "rock in a sock" in mind: a relaxed, flail-like swing that locks only at impact. The System of Inevitability's principle and the double-peak pattern are strikingly similar. The system arrived at it through practice; the researchers found it in elite fighters with electrodes. This is one of the most encouraging points of contact between the system and the science.

◐ EVIDENCE: SUGGESTIVE · EMERGING

Relax to accelerate, stiffen to strike. Elite fighters show a double peak of muscle activation, with relaxation between an initial stiffening and a second burst at impact (McGill et al., 2010). The study was small (five athletes) and descriptive; the proposed functions of each peak are reasonable interpretations, not direct measurements. The pattern closely resembles the system's "rock in a sock" principle.

Effective mass

When a fist strikes a target, how much of the body is "behind" it? Not the whole body: the arm is linked to the trunk by soft, moving joints. But not just the fist either. Biomechanists use the idea of **effective mass**: the mass that, moving at the speed of the hand, would deliver the same momentum to the target. A loose arm behaves like a light object; a stiffened, well-aligned arm and trunk behave like a heavier one.

The idea has been tested directly. In a study of palm strikes against a basketball, kung fu practitioners struck with greater hand speed than non-practitioners (about 6.7 versus 5.0 metres per second), but the larger difference was in effective mass, about 2.6 kilograms versus 1.3. For untrained people, the effective mass was statistically the same as the mass of their hand and forearm; for the martial artists, it was significantly greater. The authors suggested that against heavier targets, effective mass might be the main factor distinguishing trained from untrained strikers (Neto et al., 2007).

In a study of Olympic boxers punching an instrumented crash-test dummy head, straight punches averaged about 3,400 newtons of force at hand speeds around 9 metres per second, with an average effective punch mass of about 2.9 kilograms. Heavier boxers hit harder, mainly because their effective mass was larger (Walilko et al., 2005). A review of effective mass in combat sports concluded that it is a useful measure but that punching complicates it, because the puncher continues to push during the impact (Lenetsky et al., 2015). Using a purpose-built boxing dynamometer, another study found that elite boxers' rear-hand straight punches averaged about 4,800 newtons, compared with about 2,400 for novices (Smith et al., 2000).

Physicists, too, have long been interested in striking. Analyses of the karate punch as collision mechanics showed that damage to a target depends on contact being made when the fist is moving fastest, and that "focusing" a punch to finish a few centimetres *inside* the target maximizes deformation (Walker, 1975). Later work examined the dynamics and biomechanics of karate strikes in more detail (Wilk et al., 1983).

● EVIDENCE: WELL-ESTABLISHED

Speed and effective mass both matter. The impact of a strike depends on the speed of the striking segment and on how much mass is effectively coupled behind it at contact. Trained strikers tend to have higher effective mass than untrained ones (Neto et al., 2007; Walilko et al., 2005; Lenetsky et al., 2015).

What the research suggests for "rock in a sock"

Put together, the double-peak findings and the effective-mass findings tell a coherent story that fits the system's principle well:

- **A relaxed swing** allows the distal segments to whip through faster, exploiting the kinetic chain described in Chapter 4.
- **A stiffening at impact** couples more of the body's mass behind the contact point, increasing effective mass.
- **Timing** is everything: stiffening too early slows the strike; stiffening too late lets the hand "bounce" off, delivering little momentum and risking injury to a loose wrist.

That last point deserves emphasis. A loose wrist at the moment of impact is a classic way to sprain or fracture the hand. The "lock at impact" part of "rock in a sock" is not optional. It is what protects the hand, and it is a skill that has to be learned gradually, at low force, before any hard target is struck.

Palms, elbows, and the variety of strikes

The project materials describe a whole family of strikes: bent-knuckle punches, hammerfists, forearm strikes, elbows, and shoulders. What does research say about how they compare?

The best overview is a systematic review and meta-analysis of upper-limb strikes in combat sports. It found 28 studies covering nine kinds of strike. Straight punches and reverse punches produced larger mean impact forces than a kung fu punch, and palm strikes were slower than several kinds of punch. The highest mean force recorded in the literature was for a straight punch, about 3,400 newtons (Beránek et al., 2023). The review's authors noted that relatively few strike types have been studied.

As Chapter 3 described, a later study of trained practitioners striking from a dominant position on the ground found that palm strikes and elbow strikes produced higher peak forces than straight punches in that position (Beranek et al., 2020). Elbow strikes also have the smallest contact area of the common striking surfaces (Beranek et al., 2022). Forensic measurements of fist, hand-edge, and open-hand strikes in ordinary volunteers showed large differences between individuals (Adamec et al., 2021). And in hand-dominance studies of kung fu palm strikes, strikes were stronger with the dominant hand and when stepping toward the target (Neto et al., 2012).

What has *not* been studied, as far as this book could find:

- the bent-knuckle J-fist punch;
- the backward hammerfist;
- strikes delivered in rapid succession by the same arm on the same spot;
- the force of a strike that begins from the rebound of the previous one.

○ PRACTITIONER EXPERIENCE · PHILOSOPHY

"100% energy economy" and "zero wasted motion" are untested. The project materials describe the system as approaching 100% energy economy. No human movement does this. Muscles convert chemical energy to mechanical work with substantial losses as heat; each impact dissipates energy into the target and into the striker's own tissues; and every change of direction costs energy. These phrases are best read as an aspiration toward economy of motion, which can be studied (Chapter 13), not as a measurable claim.

Does the wave "recycle"?

The micro-vortex is described as recycling energy: the rebound of one strike powering the next. There is a real physical idea in here. When a fist or elbow hits a heavy bag and bounces back, some of the kinetic energy returns as rebound motion. A skilled practitioner could redirect that rebound into the next movement instead of stopping it and starting over. In elastic tissues, too, energy stored during a deceleration can be partly returned in the next acceleration (Roberts & Azizi, 2011).

But physics sets limits. Every impact that deforms a target converts much of the strike's energy into deformation, heat, and sound. That is, after all, what a strike is *for*. The energy that comes back from a heavy bag is a fraction of what went in, and the energy that comes back from a person is less, and less predictable. A sequence of strikes can be made *efficient*, by avoiding pauses and wasted movement, but it cannot be self-powering. Each strike in the micro-vortex still has to be driven by the body's muscles. A good way to think of "recycling" is as the skill of *not wasting* the rebound, rather than as a source of free energy.

Efficiency is not the absence of effort. It is effort that arrives where it is needed and nowhere else.

Training the switch

If relaxation is a skill, how is it trained? Here the research is thin. McGill and colleagues suggested "pulse training" that emphasizes the rate of relaxation as well as contraction (McGill et al., 2010), but did not test it. One study of runners found that consciously relaxing the hands and upper body did not improve running economy, while periodic smiling did, slightly (Brick et al., 2018). That is a reminder that "relax" is a hard instruction to follow on purpose, and that indirect cues sometimes work better than direct ones.

The system's own approach, slow wave practice before speed, single-arm sequences before multi-limb ones, and a freestanding bag that gives honest feedback, is a reasonable way to explore the skill. The safe progression in Chapter 12 builds on it: slow, unloaded movement first, then light contact, then gradually increasing speed and force, always with the "lock at impact" in place before power is added.

CHAPTER 6

Figure-Eights and Momentum Switches



Momentum switches create an oscillating figure-8 within the small circle.

— FROM THE SYSTEM OF INEVITABILITY PROJECT MATERIALS

Readers of *Walking and Turning* met the figure-eight before. The three-ball cascade, the first juggling pattern, traces a sideways figure-eight in the air as the balls cross from hand to hand. Researchers who studied cascade juggling found that skilled jugglers are not rigid metronomes but flexibly coupled oscillators, adjusting the timing of each hand to keep the whole pattern stable (Beek & Turvey, 1992). The figure-eight, in juggling, is not a shape anyone draws on purpose. It *emerges* from the rules of the pattern.

The System of Inevitability uses the same image for its close-range striking. Its single-arm micro-vortex (punch, same-spot elbow, backward hammerfist, lateral elbow, return) is said to trace an oscillating figure-eight within a small circle, with momentum "switching" at each transition. This chapter asks what science can say about patterns like this: how they hold together, how they switch, and how they come to feel automatic.

Patterns that organize themselves

In the 1980s, the physicist Hermann Haken and the neuroscientist Scott Kelso, with Herbert Bunz, published a mathematical model of a deceptively simple ex-

periment. In earlier experiments by Kelso, people moved their two hands or index fingers back and forth, either in mirror symmetry (in phase) or in parallel (anti-phase), and to speed up gradually. People who started in the anti-phase pattern, past a certain speed, *spontaneously switched* to the in-phase pattern, without meaning to. The reverse did not happen. The model, now known as the HKB model, explained this as a **phase transition** in a self-organizing system: as a control parameter (speed) changed, one stable pattern of coordination lost its stability and the system jumped to another (Haken et al., 1985). Kelso and Schöner went on to develop this into a general account of how coordinated movement patterns self-organize (Kelso & Schöner, 1988).

The same kind of dynamics has been found in real fighting. In a study of expert kendo matches, opponents' stepping movements were coupled in two distinct modes: at close range they moved in anti-phase, maintaining a safe distance, while from farther away they switched abruptly to in-phase movement to close the gap. The switch happened at a **critical interpersonal distance**, a sudden transition between two stable coordination patterns (Okumura et al., 2012).

● EVIDENCE: WELL-ESTABLISHED

Coordination patterns self-organize and switch. Human movement coordination shows stable patterns and abrupt transitions between them as conditions change, as described by the HKB model and confirmed across many tasks (Haken et al., 1985; Kelso & Schöner, 1988). Similar transitions appear between opponents in kendo (Okumura et al., 2012).

What does this have to do with a micro-vortex? Perhaps a good deal, in principle. The system describes each transition, from punch to elbow, from elbow to backward hammerfist, from hammerfist to lateral elbow, as a "momentum switch." In the language of coordination dynamics, each strike might be a temporarily stable pattern, and each switch a transition triggered when the motion, the rebound, and the arm's position reach a certain state. If so, the sequence would "feel automatic" for a good reason: the body is not choosing each strike, it is falling from one stable pattern into the next.

That is a hypothesis, not a finding. Nobody has measured the micro-vortex. But it is a much better hypothesis than "fractal kinetic chaining," because it can be tested: a motion-capture study would show whether the transitions occur at consistent joint angles or speeds, and whether they become more consistent with practice.

Why the pattern feels automatic

The project materials say the micro-vortex feels automatic once the wave is initiated. That, too, has a scientific counterpart.

When people practise a sequence of movements, the brain gradually groups the elements into **chunks**: short runs of movements executed as a unit, with pauses between chunks rather than between each element. In a classic study of visuomotor sequence learning, people spontaneously organized long sequences into chunks, and the chunks became their own units of performance (Sakai et al., 2003). Brain imaging has since shown that different brain networks are associated with binding elements together into chunks and with parsing sequences into separate chunks, and that chunks grow stronger over days of training (Wymbs et al., 2012).

A five-element loop, practised thousands of times, is exactly the kind of thing that becomes a chunk. Once it does, starting it may be enough to run it through, which is what "automatic" feels like from the inside.

There is a cost to automaticity, too. A chunk that runs on its own is hard to interrupt. That is useful if the situation is predictable. It is less useful against a live opponent who moves, or when the person in front of you turns out not to be a threat at all. Chapter 9 and Chapter 11 return to this.

> ● EVIDENCE: WELL-ESTABLISHED
>
> **Practised sequences become chunks.** With practice, the brain groups movement sequences into chunks that are executed as units (Sakai et al., 2003; Wymbs et al., 2012). This is a general finding about sequence learning; it has not been studied in the micro-vortex specifically.

"Four to five impacts in under a second"

The project materials describe the micro-vortex as producing **"4–5 stacked impacts in under one second"** on or near the same target. Is that plausible?

As a matter of *timing*, yes. The path is described as small, about 8 to 14 inches (roughly 20 to 35 centimetres) per circle. Boxers' hands have been measured moving at average speeds of about 6 to 8 metres per second at contact, with peaks above 12 metres per second (Whiting et al., 1988). Even at a much lower average speed of, say, 3 metres per second, a 30-centimetre segment of path would take about a tenth of a second. Five such segments, with brief contacts, could fit within a second. That is simple arithmetic, not a measurement, and it says nothing about how forceful each impact would be.

As a matter of *effect*, the claim is untested and much harder. Several questions are open:

- Does each impact carry meaningful force, or are the later ones light taps riding on the rebound?
- Does the "same spot" really get hit again, or does the target (or a person) move after the first impact?
- Do the impacts "stack" in any meaningful sense? Repeated impacts on a heavy bag add up only as separate events; there is no evidence of "compounding resonance."
- Does the sequence survive contact with a target that does not behave like a freestanding bag?

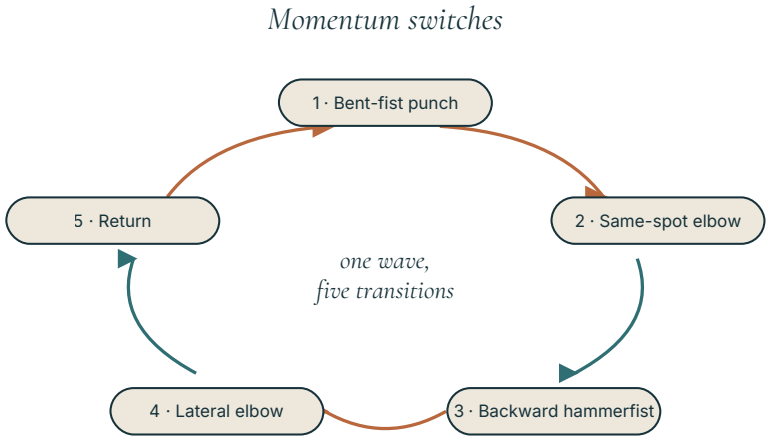
> ○ PRACTITIONER EXPERIENCE · PHILOSOPHY
>
> **Stacked impacts and compounding resonance are untested.** The claim of 4–5 impacts in under a second is plausible as a cadence but has not been filmed or measured. "Compounding resonance" has no support in physics or biomechanics. Chapter 13 describes a simple filmed test that would settle the cadence question and give a first look at the force question.

Geometry as a teaching image

If the physics of "toroidal fields" is not real, is the geometry useless? Not at all.

Images like figure-eights, spirals, and loops can be powerful **teaching cues**. They give a learner a single, simple picture that organizes many joints at once. Research on attentional focus, discussed in Book 1, has found that directing attention to the *effect* of a movement, rather than to the body parts producing it, generally improves both performance and learning (Wulf, 2013). "Trace a figure-eight with the fist" or "let the elbow follow the circle" are effect-focused cues of exactly this kind. They may help because they are not anatomical instructions.

The figure-eight also has a long history as a symbol, and it would be strange to ask practitioners not to find meaning in it. An anthropologist of martial arts has even used the "infinity loop" as a model for how efficacy and performance feed each other in martial traditions, while warning that when the two collide, practitioners can be misled into false beliefs about what works (Farrer, 2015). That double lesson is worth keeping: the loop can inspire, and it can deceive.



The micro-vortex path read as a sequence of momentum switches. Each arrow marks a transition from one stable strike pattern to the next. A hypothesis for motion-capture research, drawn as a schematic.

Inevitability, revisited

The system's name rests on a psychological claim: that its motion feels "predestined" to the opponent because it emerges from universal patterns. The materials call this "psychological inevitability."

What would that mean, scientifically? Expert fighters are very good at anticipating what an opponent will do from early cues in their movement (Mori et al., 2002; Mann et al., 2007), and they pick up repeated patterns quickly (Milazzo et al., 2016). A fighter whose sequences are *unpredictable* might make that anticipation harder. On the other hand, a fighter who always runs the same loop would become *more* predictable, not less, to an experienced opponent. The claim cuts both ways, and only testing against skilled, resisting partners could tell which way it cuts for this system. Chapter 9 looks at this research in more detail.

A pattern that emerges is beautiful. A pattern that repeats is readable.

CHAPTER 7

Breath



Inhale on compression, exhale on release.

— BREATH SYNCHRONIZATION, FROM THE PROJECT MATERIALS

Every martial tradition seems to have something to say about breathing. Karate has the *kiai*, the sharp shout at the moment of a strike. Boxers hiss or grunt as they punch. Tai chi teaches slow, deep breathing coordinated with movement. Russian Systema, which the System of Inevitability names as a parallel path, places breath and relaxation at its very centre. The System of Inevitability itself recommends synchronizing the breath with the wave: inhale on compression, exhale on release.

Breathing does at least three different jobs in a striking art. It **braces** the trunk. It may **amplify** force at the moment of effort. And it **regulates** the nervous system, the state of calm or arousal in which every decision is made. The science of each job is different, and it is worth taking them one at a time.

Breath as brace

When you lift something heavy, you probably hold your breath without thinking. That is not an accident. Holding a breath after inhaling raises the pressure inside the abdomen, which stiffens the trunk. In a study that measured intra-abdominal pressure during lifting, holding the breath after an inhalation produced significantly greater peak pressure than natural breathing, holding after an exhalation, or breathing out during the lift (Hagins et al., 2004).

Stiffening the trunk is useful in striking, too. The first peak of McGill's "double peak" (Chapter 5) seems to be about creating a stable core for the limbs to work against (McGill et al., 2010). But breath-holding has a cost that matters for anyone training hard. During heavy straining with the breath held, a manoeuvre called the Valsalva manoeuvre, blood pressure can rise to extreme levels. In experienced bodybuilders, directly measured arterial pressures during heavy leg presses averaged 320/250 mmHg, and exceeded 480/350 in one person (MacDougall et al., 1985).

⚠ CAUTION

Don't hold your breath through repeated strikes. Long breath-holds under maximal effort cause extreme spikes in blood pressure (MacDougall et al., 1985). If you have high blood pressure, heart disease, eye conditions such as glaucoma or retinal problems, or a history of stroke or aneurysm, speak to a physician before any hard striking or straining. In the micro-vortex and bag work, keep breathing: short, sharp exhalations with strikes are generally safer than holding.

Breath as amplifier

What about shouting or grunting? It sounds like folklore, but it has been tested.

In a study of 50 martial artists, 25 novices and 25 experts, handgrip strength was significantly greater when participants shouted a *kiap* (the Korean equivalent of the kiai) than when they did not: about 437 newtons compared with 408 (Welch & Tschampl, 2012). In collegiate tennis players, serve and forehand velocities and isometric force were significantly greater when players grunted, and peak muscle activity in the chest and trunk muscles was higher too (O'Connell et al., 2014).

◐ EVIDENCE: SUGGESTIVE · EMERGING

A sharp exhalation or shout may boost force slightly. Shouting during effort increased grip strength in martial artists, and grunting increased stroke velocity and force in tennis players (Welch & Tschampl, 2012; O'Connell et al., 2014). The effects are modest and come from a small number of studies; how they work (trunk stiffening, arousal, or attention) is not settled.

The system's instruction, exhale on release, is consistent with these findings. A forceful exhalation at the moment of the strike may help coordinate the trunk's stiffening with the impact, the second peak of the double peak. Whether a specific breath pattern improves the micro-vortex has not been tested.

Breath as regulator

The third job of breathing is the one that matters most for the "consciousness" theme of this series, and for the ethics chapters to come.

Breathing is unique among the body's automatic functions: it runs by itself, but you can take it over at will. And the way you breathe changes the state of your nervous system. A systematic review of slow-breathing studies found that breathing at slow rates, below ten breaths a minute, was associated with increased heart-rate variability and markers of parasympathetic ("rest and digest") activity, and with increased comfort, relaxation, vigour, and alertness, along with reduced arousal, anxiety, anger, and confusion (Zaccaro et al., 2018). The mechanism is partly understood: slow breathing interacts with the heart's natural rhythm and with the reflexes that regulate blood pressure, which is the basis of heart-rate-variability biofeedback (Lehrer & Gevirtz, 2014).

A randomized controlled study compared three daily five-minute breathing practices with mindfulness meditation over a month. Breathing with extended exhalations, called cyclic sighing, produced greater improvement in mood and a greater reduction in breathing rate than mindfulness meditation did (Balban et al., 2023).

● EVIDENCE: WELL-ESTABLISHED

Slow breathing calms the nervous system. Slow, controlled breathing is reliably associated with increased heart-rate variability and reduced arousal and anxiety (Zaccaro et al., 2018; Lehrer & Gevirtz, 2014). Brief daily breathing practices with long exhalations improved mood in a randomized study (Balban et al., 2023). Effects on performance in combat have not been directly tested.

This is where breath stops being a technique for hitting harder and becomes a technique for *choosing well*. Chapter 10 looks at what stress does to perception and decisions, and how breathing and attention training can help. Chapter 11 argues that the most important strike a practitioner can learn to "time" is the one they don't throw.

Systema: what is and isn't known

The project materials present Russian Systema as a "parallel path up the same mountain," sharing with the System of Inevitability an emphasis on continuous flow, natural movement, relaxation, breath, and wave-like motion. They also describe Systema as "used by Spetsnaz/FSB."

Here this book has to be careful.

First, as of the time of writing, this book could not find any peer-reviewed study of Systema: no biomechanical analysis, no training study, no outcome data. Searches of the scholarly indexes used to verify every reference in this book returned nothing on Systema specifically. That does not mean Systema is ineffective. It means its claims, like the System of Inevitability's, have not been tested in published research.

Second, the association between Systema and Russian special forces is widely repeated in popular and commercial sources, but this book could not verify it in any scholarly source. It is best treated as part of the art's own story about itself, not as evidence of effectiveness. Even if a military unit uses a method, that tells us it was chosen, not that it was tested against alternatives.

Third, the *principles* the two systems share, relaxation, breath control, and continuous adaptive movement, do have research behind them, and much of it is in this book: the double peak of relaxation and stiffening (Chapter 5), breath and arousal (this chapter), variable practice (Chapter 8), and calm under pressure (Chapter 10). The parallel between the two systems is real at the level of principle. It is unverified at the level of outcomes.

○ PRACTITIONER EXPERIENCE · PHILOSOPHY

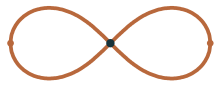
Systema parallels are conceptual. The shared emphasis on breath, relaxation, and flow is a reasonable philosophical parallel. No peer-reviewed research on Systema was found; claims about its military use could not be verified in scholarly sources and should not be treated as validation of either system.

A simple breathing practice

Here is a practice that draws on the research above and costs nothing. It is a suggestion, not part of the System of Inevitability.

1. **Before training**, sit or stand quietly for two minutes. Breathe in through the nose, take a second small "top-up" inhalation, then breathe out slowly through the mouth, longer than the inhalation. This is the cyclic sigh studied by Balban et al. (2023). Notice your shoulders and hands soften.
2. **During slow wave practice**, let the breath follow the movement as the system suggests: in as the body gathers and compresses, out as it releases. Keep it unhurried.
3. **During bag work**, use short, sharp exhalations with strikes. Never hold your breath through a sequence.
4. **After training**, return to the slow breathing for a minute, and notice how quickly your heart rate settles. Over weeks, that recovery is a small measure of your nervous system's growing flexibility.

The breath is the one door between the part of you that reacts and the part of you that chooses.



Part III · The Learning

Repetition without repetition. The same problem, solved a little differently every time.

CHAPTER 8

Never the Same Strike Twice



The practitioner does not pre-plan sequences; geometry and bag feedback generate patterns on the fly.

— FROM THE SYSTEM OF INEVITABILITY PROJECT MATERIALS

Most traditional martial arts are taught by repetition. A student practises a punch, a block, or a form hundreds of times, in exactly the same way, until it is "grooved." The System of Inevitability takes a different view. It describes itself as **non-repetitive**: combinations are not memorized but generated afresh, "fractal" chains emerging from a few principles and from the feedback of the bag or dummy. In Book 1 we saw the same idea in its juggling: patterns that are never quite the same twice.

Is that a good way to learn? This is one of the places where the system's philosophy meets a large and lively body of research, with real support and real controversy.

Variability is not the enemy

For much of the twentieth century, variability in movement was treated as noise: error to be stamped out by repetition. The Russian physiologist Nikolai Bernstein famously described skilled practice instead as "repetition without repetition," solving the same motor problem again and again, each time slightly differently. Modern research has given that idea substance.

In a pair of experiments on how people learn new arm movements, people who naturally showed more *task-relevant* variability in their movements learned faster, both across individuals and across tasks. The researchers also found that training could reshape the structure of a person's variability to suit the task. Variability, in other words, is partly how the nervous system **explores** (Wu et al., 2014).

A long line of research on **contextual interference**, discussed in Book 1, points the same way. When people practise several skills in a mixed, random order rather than in blocks of the same skill, they usually perform worse *during* practice but remember and transfer the skills better later (Shea & Morgan, 1979). Later experiments helped separate two ingredients: the benefit of mixing different kinds of movements, and the benefit of varying the parameters of one kind of movement (Hall & Magill, 1995).

● EVIDENCE: WELL-ESTABLISHED

Variable practice generally helps learning. Task-relevant motor variability predicts faster learning (Wu et al., 2014). Mixed or random practice usually impairs performance during training but improves retention and transfer compared with blocked repetition (Shea & Morgan, 1979; Hall & Magill, 1995).

Differential learning: promise and controversy

One approach takes variability to an extreme. **Differential learning**, developed by the German sport scientist Wolfgang Schöllhorn, deliberately adds large, ever-changing variations to practice: no two attempts are the same, and learners are not corrected toward a single ideal form. The theory is that the nervous system finds its own solution by sampling widely around it.

Some studies have found impressive effects. In one, semi-professional badminton players showed different patterns of brain activity after differential training than after repetitive training, which the authors interpreted as faster early consolidation of learning (Henz & Schöllhorn, 2016).

But the overall evidence is more cautious. An exploratory meta-analysis gathered 27 studies comparing differential learning with other methods. It

found a small advantage during acquisition and a medium advantage at retention, but warned that the studies were heterogeneous, small, at high risk of bias, and possibly affected by publication bias, so that "inferences about the effectiveness of DL would be premature" (Tassignon et al., 2021). Schöllhorn and colleagues have responded by arguing that the debate depends heavily on which model of motor learning a researcher assumes, and that individual learners in dynamic situations may not follow any one general rule (Schöllhorn et al., 2022).

◐ EVIDENCE: SUGGESTIVE · EMERGING

Highly variable "differential" practice is promising but unproven. Some studies find advantages for differential learning, and a meta-analysis found small-to-medium average benefits, but with high risk of bias and large heterogeneity (Tassignon et al., 2021). The method's developers and critics still disagree about how to interpret the evidence (Schöllhorn et al., 2022).

Constraints, not commands

A related family of ideas comes from **ecological dynamics** and the **constraints-led approach**. In this view, a skill is not a stored program but a solution that emerges from the interaction of three kinds of constraints: the performer (body, fitness, intentions), the task (rules, goals, equipment), and the environment (surfaces, space, opponents). A coach shapes learning less by telling the learner what to do than by *designing the problem*: changing the constraints so that good solutions emerge (Renshaw et al., 2010). Applied to teaching, this is called **nonlinear pedagogy**: manipulating key constraints so that functional movement patterns and decisions emerge in learners (Chow et al., 2007). Decision-making in sport, on this view, emerges from the continuous coupling of the athlete and the environment rather than from a central plan (Araújo et al., 2006).

The System of Inevitability's training on a freestanding bag and a metal-armed dummy is, in this language, a constraints-led practice. The bag's rebound, its swing, and its weight shape the movements that emerge; the

dummy's rigid arms shape the alignment of the forearm and wrist. The practitioner does not decide in advance what to throw. The tools pose the problem.

That is a real strength. But the constraints-led approach also insists on something the system's solo tools cannot provide: **representative design**. Practice environments should faithfully represent the information and demands of the situation the skill is meant for (Pinder et al., 2011). A bag and a dummy represent some of the demands of close-range fighting, such as contact, rebound, and alignment. They do not represent the most important demand: another person who perceives, decides, and moves.

> ◐ EVIDENCE: SUGGESTIVE · EMERGING
>
> **Designing the problem is a powerful way to teach.** Constraints-led and nonlinear pedagogy approaches have a strong theoretical basis and growing empirical support (Renshaw et al., 2010; Chow et al., 2007; Araújo et al., 2006). Their own central principle, representative design, implies that solo tools must eventually be supplemented by practice with live partners (Pinder et al., 2011).

Silat's answer: jazz

Here the anthropology of Silat offers a beautiful parallel. In a study of Sundanese pencak silat in West Java, the anthropologist Lee Wilson compared learning to improvise in silat with learning to improvise jazz piano. In both, he argued, improvisation is not random: it is a highly structured process that proceeds from mastering a few *generic principles*, from which "potentially unbounded repertoires" of responses can be generated. He contrasted this with the nationally standardized form of silat, in which the generative potential of the practice was subordinated to the goal of uniformity (Wilson, 2009).

The System of Inevitability's claim to be non-repetitive and principle-based is, in this light, part of an old and respected tradition, one that a scholarly study has described from inside the Silat lineage the system cites. It also suggests what "non-repetitive" should mean in practice: not *anything goes*, but a small set of well-learned principles applied freshly each time.

Implicit learning and the trouble with thinking

One more strand of research supports the system's preference for emergent over explained movement. When people learn a skill with a great deal of conscious, explicit knowledge of the rules, they can be more likely to break down under pressure, because pressure tempts them to consciously monitor and control the movement. Learners who acquire the same skill more implicitly, with less rule-knowledge, may be more robust (Masters, 1992). Studies of "choking" have found that pressure can harm skilled performance by drawing attention to processes that run best without it (Beilock & Carr, 2001). And as Book 1 discussed, directing attention to the effect of movement rather than to the body generally helps learning (Wulf, 2013).

A practice built on images (waves, loops, figure-eights) and on feedback from a tool, rather than on detailed joint-by-joint instruction, may favour exactly this kind of robust, implicit learning. That is a reasonable hypothesis. It has not been tested in this system.

Where non-repetition can go wrong

Variability is not a magic ingredient. Three cautions follow from the research:

1. **Variability around what?** Wu and colleagues found that *task-relevant* variability helped. Random flailing is not task-relevant. The system's principles (alignment, the wave, the lock at impact) are what make its variability meaningful. Without them, variation is just noise.
2. **Safety needs consistency.** Some things should never vary: the wrist must be aligned and braced at impact, every time. A practice that varies the *path* of a strike can still be strict about *structure* at contact.
3. **Solo variability is not opponent variability.** A bag varies in predictable physical ways. A person varies intelligently, and tries to make you miss. The next chapter turns to what research says about learning to deal with that.

Freedom in the path. Discipline at the point of contact.

CHAPTER 9

Reading the Other



A bag swings back. A person decides.

Everything in the last few chapters, the wave, the double peak, the micro-vortex, can be practised alone. That is one of the System of Inevitability's great strengths: like Book 1's iron balls and ring bar, its striking tools need no partner, no gym, and no instructor. It is also its greatest limitation as a martial system, and the materials themselves acknowledge it when they say that full viability requires "progressive pressure-testing." This chapter explains, from the research, why.

Combat is a conversation

A group of researchers in the Netherlands and Britain have argued that combat sports should be understood as an **interpersonal synergy**. In a fight, two athletes continuously co-adapt to each other: each perceives the other's possibilities for attack and defence, and each acts on those perceptions, so that the two of them self-organize into a single coupled system. Skilled fighters, they argue, operate in "meta-stable regions on the limits of their capabilities," exploiting moments when the coupling becomes unstable. They reviewed evidence that expert fighters perceive their own and their opponents' action boundaries accurately, and that local actions of each fighter produce synchronization at the level of the whole fight (Krabben et al., 2019). The kendo study of the last chapter, with its

sudden switch between coordination modes at a critical distance, is one example (Okumura et al., 2012).

If that view is right, then the most important skills in close-range combat are not the strikes themselves but the **perception and timing** that decide when, where, and whether to strike.

What experts see

There is strong evidence that expertise in combat sports is, to a large degree, perceptual.

In a study of karate athletes and novices, the athletes were faster at a choice-reaction task when the stimulus was video of an opponent's attack, deciding whether it was aimed high or middle, but not when the stimulus was simple dots. Their simple reaction times were no faster than novices'. And when the video was cut off very early in the attack, the athletes were still much more accurate at predicting where it was going (Mori et al., 2002). Experts, in other words, are not faster in general. They are better at **reading** the specific information that matters.

A meta-analysis across many sports found that experts consistently outperform non-experts in perceptual-cognitive skills: they pick up cues earlier, anticipate more accurately, and use their eyes more efficiently (Mann et al., 2007). In on-mat karate tasks, experts were faster and more accurate at blocking and counter-attacking, detected a repeated attack pattern after only five repetitions while novices did not, and used a more efficient visual search strategy, with fewer, longer fixations (Milazzo et al., 2016).

> ● EVIDENCE: WELL-ESTABLISHED
>
> **Expertise in fighting is perceptual.** Expert combat athletes anticipate opponents' actions from early cues and pick up patterns quickly, without being faster in simple reaction time (Mori et al., 2002; Mann et al., 2007; Milazzo et al., 2016).

These findings cut against the idea of a fixed, repeated sequence. Milazzo's karate experts spotted a repeated attack after *five* repetitions. A fighter who always

ran the same micro-vortex would be handing a skilled opponent the same gift. The system's emphasis on "non-repetitive" chaining is, in this light, exactly right in principle. But it can only be *learned* against someone who is trying to read you.

The bag does not read you

A freestanding heavy bag and a metal-armed dummy provide real physical feedback: contact, rebound, resistance, alignment. They do not provide the information a fighter must learn to read, and they never try to read the fighter in return.

Research on training specificity shows how much this matters. In a study of mixed martial arts athletes wearing accelerometers, the same techniques (jabs, crosses, hooks) produced significantly *different* loads when performed in isolation than when performed in sparring, and the patterns of difference between techniques also changed (Kirk et al., 2015). A strike practised alone is, physically and perceptually, not quite the same movement as a strike thrown at a person who is moving.

And as Book 1 discussed, skills learned in one context generally transfer poorly to distant ones. Training in chess, music, or working-memory tasks does not reliably improve unrelated abilities (Sala & Gobet, 2017). Close transfer, from one setting to a similar one, is far more reliable than far transfer. A bag is a moderately close relative of a person. It is not a twin.

> ● EVIDENCE: WELL-ESTABLISHED
>
> **Practice is specific.** The same techniques produce different movement loads alone and in sparring (Kirk et al., 2015), and far transfer between dissimilar tasks is weak (Sala & Gobet, 2017). Representative practice, which preserves the information of the real situation, is needed for skills to transfer (Pinder et al., 2011).

What winners do

Studies of real bouts give a picture of what actually decides close-range fights in sport. In an analysis of 33 elite amateur boxing bouts, winners threw more punches, more combinations, and used defensive skills more effectively, with defence integrated with movement of the arms, feet, and trunk (Ashker, 2011). The physiological demands of amateur boxing are substantial and predominantly aerobic: a three-round bout against pads modelled on competition required a large aerobic energy contribution (Davis et al., 2014), and reviews describe amateur boxing as a high-intensity, intermittent sport that demands high cardiorespiratory fitness, anaerobic power, strength, and muscular power in both the upper and lower limbs (Chaabène et al., 2015; Slimani et al., 2017).

These are findings from a sport with rules, gloves, and a referee, and they do not translate directly to the system's close-quarters setting. But they underline something the system's materials sometimes overlook: in any real exchange, *defence, footwork, perception, and conditioning* decide as much as the elegance of an attacking sequence.

"Psychological inevitability" and the opponent's mind

The system's name rests on a claim about the opponent: that its motions feel "predestined" because they arise from universal patterns, so that the opponent "fights the geometry rather than a person."

Is there anything in the research that could support or refute this? Indirectly, yes. Expert fighters thrive on *predictable* information (Milazzo et al., 2016); unpredictability is what makes their anticipation fail. A system that genuinely generates fresh, non-repeating combinations from principles could make an opponent's anticipation harder. That would be a meaningful advantage. But no study has tested whether this system does that, and the experience of feeling "inevitable" from the inside is not evidence of what an opponent experiences.

The only way to find out is to ask opponents, under controlled conditions, with something at stake. Chapter 13 suggests how.

○ PRACTITIONER EXPERIENCE · PHILOSOPHY

"Psychological inevitability" is untested. Whether opponents experience the system's motion as unreadable or "predestined" has never been studied. Research on anticipation suggests that genuinely unpredictable sequences could be an advantage, while repeated ones would quickly become readable to a skilled opponent.

Partners, not targets

If perception and timing can only be learned against a person, then the most important training tool is not the bag or the dummy. It is a **partner**: someone who will move, feint, resist, and give honest feedback, at an intensity both of you can control.

That changes the nature of practice. A bag cannot be hurt. A partner can. From this point on, the science of skill and the ethics of training are inseparable. Chapter 11 sets out what that means, and Chapter 13 describes a graduated way of testing with partners that keeps both people safe. First, though, we need to look at what happens to all of these skills when fear enters the room.

The bag teaches the hand. Only a person can teach the eyes.

CHAPTER 10

Calm Under Pressure



Fear narrows the world. Training can widen it again.

Every skill in this book was described as if it would be performed calmly: a relaxed swing, a well-timed stiffening, an open, perceptive attention to the other person. Real confrontations are not calm. The heart pounds, the breath shortens, vision narrows, hands shake, and thinking becomes simple and urgent. For a martial art, and for any person who hopes to behave well when it matters, what happens to skill and judgement under that kind of pressure is perhaps the most important question of all.

Fortunately it is one of the best-studied.

What fear does to skill

According to **attentional control theory**, anxiety impairs the brain's goal-directed attention system and strengthens the stimulus-driven one: attention is pulled toward threats and away from the task. Anxious people may still perform well if they compensate with extra effort, but their processing becomes less efficient (Eysenck et al., 2007). A review focused on perceptual-motor performance proposed an integrated model in which anxiety can affect what people perceive, how they interpret it, and how they act, sometimes for better but often for worse (Nieuwenhuys & Oudejans, 2012).

The most vivid evidence comes from police officers, who have to perform physical skills under real threat. In one study, officers' arrest and self-defence

skills, rated on a carefully validated five-point scale, deteriorated markedly when they were performed under pressure (Nieuwenhuys et al., 2009). In another, officers kicked, blocked, or restrained an opponent attacking with either a rubber knife or a knife that delivered a real electric shock. Under the higher threat, performance was worse, and full-body movement analysis revealed *avoidance*: faster but poorer reactions, leaning backward when kicking, ducking when blocking (Renden et al., 2014). The officers' bodies were trying to get away from the threat even while they were trying to deal with it.

● EVIDENCE: WELL-ESTABLISHED

Pressure degrades skill. Anxiety shifts attention toward threat and away from the task, reducing processing efficiency (Eysenck et al., 2007). Police officers' arrest and self-defence skills deteriorate under pressure, and movement takes on features of avoidance (Nieuwenhuys et al., 2009; Renden et al., 2014).

This matters for the micro-vortex and every other sequence in this book. A pattern practised only in calm conditions, against a bag that never threatens, has not been tested in the conditions where it would matter most.

Training with fear

The encouraging part of this research is that the effects of pressure can be trained.

In one study, police officers practised handgun shooting either against cardboard targets or against a live opponent firing back with coloured soap cartridges. At the start, both groups shot worse when the opponent fired back. After just three one-hour training sessions, the group that had trained under pressure no longer got worse under pressure, while the other group still did (Oudejans, 2008). A follow-up found the benefit was still present four months later (Nieuwenhuys & Oudejans, 2011). Expert basketball players and darts players showed the same pattern: only those who practised *with* anxiety maintained their performance in an anxious test (Oudejans & Pijpers, 2009).

A meta-analysis of **stress inoculation training**, which deliberately prepares people for stress through information, skills practice, and graduated exposure, pooled 37 studies with 1,837 participants. It found that the approach reduced performance anxiety and state anxiety and improved performance under stress, across a range of settings and trainer experience (Saunders et al., 1996).

Martial arts experience may help too, although it does not make anyone immune. Police officers who did additional martial arts training, even once a week, performed arrest and self-defence skills better under high anxiety than officers without such training; but they still performed worse under high anxiety than under low (Renden et al., 2015).

● EVIDENCE: WELL-ESTABLISHED

Pressure can be trained. Practising under realistic, graduated pressure protects performance under pressure, in police officers and athletes, with effects lasting months (Oudejans, 2008; Nieuwenhuys & Oudejans, 2011; Oudejans & Pijpers, 2009). Stress inoculation training reduces anxiety and improves performance under stress (Saunders et al., 1996).

Mindfulness under fire

Book 1 discussed the evidence on mindfulness meditation, which is real but more modest than its popular image (Goyal et al., 2014; Tang et al., 2015; Van Dam et al., 2018). Two studies of military personnel speak directly to pressure.

In a study of soldiers in the high-stress period before deployment, working-memory capacity declined over time in soldiers who did not receive mindfulness training. Among those who did, working memory *increased* in those who practised a lot, and declined in those who practised little. More practice was also associated with less negative and more positive mood (Jha et al., 2010). In a larger controlled study, eight platoons of Marines (281 people) took part: four received an eight-week mindfulness-based training emphasizing interoceptive awareness and attentional control, and four continued training as usual. After a stressful combat-training exercise, the mindfulness group showed faster recovery of heart

rate and breathing rate, along with differences in brain activity in regions involved in interoception, including the insula (Johnson et al., 2014).

Interoception, the sense of what is happening inside the body, connects these findings to the system's emphasis on breath and relaxation. Book 1 introduced the insula's role in bodily awareness (Craig, 2009). A review of contemplative practice and health has argued that how people *interpret* their bodily sensations lies at the heart of many stress-related problems, and that contemplative practices may reduce maladaptive interpretations and restore a sense of presence and agency (Farb et al., 2015). In combat terms: the pounding heart is not the problem. The story you tell yourself about the pounding heart may be.

◐ EVIDENCE: SUGGESTIVE · EMERGING

Mindfulness may protect attention and speed recovery under stress. Mindfulness training was associated with protected working memory in soldiers who practised more (Jha et al., 2010) and faster physiological recovery after stressful training in Marines (Johnson et al., 2014). These are promising controlled studies, not the final word; effects depended on practice time.

Calm as a decision skill

The most direct test of calm as a *decision* skill comes from policing. In a randomized pilot study, police officers were trained in techniques to enhance psychological and physiological control during stressful incidents, and then tested in realistic critical-incident scenarios. The trained group showed significantly better physiological control, better situational awareness, better overall performance, and more *correct use-of-force decisions* than the control group (Andersen & Gustafsberg, 2016).

This is a small pilot study, and it needs replication. But it points toward the deepest connection between this chapter and the next: physiological calm is not only about performing a technique well. It is about seeing clearly enough to choose the right action, which is very often *no strike at all*.

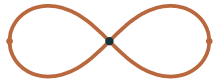
Calm is not the absence of fear. It is the presence of choice.

Building pressure into practice

How could a practitioner of the System of Inevitability build these findings into solo training, before ever stepping in front of a partner? Some suggestions, which are the compiler's and not the system's:

- **Breath before, during, and after.** Use the slow, long-exhale breathing from Chapter 7 to begin and end every session, and notice how quickly you return to calm after hard bag work. Recovery is trainable (Johnson et al., 2014).
- **Mild, graded pressure.** Add small stressors that do not increase injury risk: a timer, a partner calling out random cues, being filmed, an audience of one. The research on training with anxiety suggests that even mild pressure helps performance transfer to pressured conditions (Oudejans & Pijpers, 2009).
- **Never raise physical risk to create pressure.** Hitting harder, faster, or on a harder target when you're stressed is how hands break. Raise the *psychological* stakes, not the physical ones.
- **Practise the decision, not only the strike.** Have a partner present cues that call for different responses, including *not* striking, stepping away, or speaking. A decision that is never practised will not appear under pressure.

These are the bridges from solo practice to the partner work and testing described in Chapter 13. But before any of that, there is a question this book must ask clearly: what is all this skill *for*?



Part IV · The Responsibility

The hand that can strike must learn, first and last, when not to.

CHAPTER 11

The Ethics of the Closed Hand



The upgrade is not the power to harm. It is becoming trustworthy with it.

This is the most important chapter in the book.

Everything so far has been about capability: how a fist holds together, how a wave travels through a body, how a sequence becomes automatic, how skill survives under pressure. A person who develops those capabilities has become, in a precise and literal sense, more dangerous. The System of Inevitability describes itself as an engine "for close-quarters dominance." This series of books exists to help facilitate what its owner calls an upgrade in human consciousness. Those two things can only be reconciled in one way: if the growth in capability is matched, and exceeded, by growth in self-mastery, restraint, judgement, and care.

This chapter is about that second growth. It draws on research where research exists, and it is honest about where ethics has to go beyond what can be measured.

What a strike can do

Start with the plain facts, because they are sobering.

A **single punch can kill.** In Australia, a study of coronial records identified 90 deaths between 2000 and 2012 from "king hits," single blows to the head that caused the victim to fall unconscious, either from the punch itself or from

the head striking the ground. Most occurred at or near hotels and pubs, late at night, and alcohol was involved in about three quarters of the cases where toxicology was available (Pilgrim et al., 2014). Many of those who threw the punches presumably did not intend to kill anyone.

In a study designed to estimate head-injury risk, straight punches from Olympic boxers to an instrumented crash-test dummy head produced peak head accelerations averaging about 58 g (Walilko et al., 2005). Trained self-defence practitioners striking from a dominant ground position could, with elbow and palm strikes, exceed a force associated with skull fracture in a substantial fraction of strikes (Beranek et al., 2020). Repeated blows to the head over time are linked to lasting brain injury; the condition now called chronic traumatic encephalopathy was first described in boxers in 1928 (Bernick & Banks, 2013). In mixed martial arts, the head is the most commonly injured region, and concussion is common (Lystad et al., 2014; Curran-Sills & Abedin, 2018).

The System of Inevitability emphasizes elbows, hammerfists, forearms, and repeated strikes to the same spot, at the closest range, against the head and neck as readily as anywhere else. Whatever its effectiveness, its *potential for serious harm* is not in doubt.

> ● EVIDENCE: WELL-ESTABLISHED
>
> **Strikes can cause catastrophic harm.** Single blows to the head can kill, often through the fall that follows (Pilgrim et al., 2014). Elbow and palm strikes can reach forces associated with skull fracture (Beranek et al., 2020). Repeated head impacts are associated with long-term brain injury (Bernick & Banks, 2013).

What violence is

Scholars of martial arts have long wrestled with what they call a **violence paradox**: how can a practice built around destructive, antisocial techniques become, in the training hall, a source of positive, productive, even edifying experience? In a recent theoretical paper, two scholars proposed that violence is best understood not as a type of movement but as a characteristic of an interaction, defined as **"violation by intentional force"** (Channon & Matthews, 2026).

That definition is useful for a practitioner. The same elbow can be a skilled movement on a bag, a controlled exchange with a consenting partner, a necessary act of protection, or a violation. What makes the difference is not the geometry. It is consent, necessity, proportion, and intention. A martial art does not make its practitioners violent or non-violent. What they *choose* does.

Does martial arts training make people better?

It is often said that martial arts teach discipline, respect, and self-control. Is it true? The honest answer is: sometimes, and it depends.

On the encouraging side, a meta-analysis of 14 studies found that martial arts training had a small positive effect on wellbeing and a medium effect on reducing internalizing problems such as anxiety and depression, although its effect on aggression was close to zero and not significant (Moore et al., 2020). A separate meta-analysis of 12 child and youth studies (507 participants) found that in the nine intervention and longitudinal studies, martial arts training reduced aggression and related externalizing behaviour with a medium effect size (Harwood et al., 2017). In a study in which 207 schoolchildren were randomly assigned by class to three months of school-based Tae Kwon Do or ordinary physical education, the martial arts group improved more in cognitive and emotional self-regulation, prosocial behaviour, and classroom conduct (Lakes & Hoyt, 2004).

On the cautionary side, a multilevel meta-analysis of 12 studies with nearly 6,000 young people found *no overall relationship* between martial arts participation and externalizing behaviour. It found signs of publication bias in favour of positive results; after adjusting for it, martial arts participation was associated with *more* externalizing behaviour. Studies with more intense training also found more externalizing behaviour (Gubbels et al., 2016). A two-year longitudinal study of 477 Norwegian boys found that taking part in "power sports," including boxing, wrestling, weightlifting, and oriental martial arts, led to *increased* violent and non-violent antisocial behaviour outside sport. The authors attributed this partly to the sports themselves and partly to repeated contact with "macho" attitudes and norms (Endresen & Olweus, 2005).

Two older studies hint at why the findings diverge. In a six-month study of juvenile delinquents, those taught traditional Tae Kwon Do, with its psychological and philosophical teachings, became less aggressive and less anxious, while those taught a "modern" version stripped of those teachings became *more* aggressive and more delinquent (Trulson, 1986). In a cross-sectional study of traditional karate students, longer training was associated with lower aggressiveness (Nosanchuk, 1981). These are small, old studies and should not carry too much weight. But they point the same way as the larger reviews: *what is taught alongside the techniques matters.*

◐ EVIDENCE: SUGGESTIVE · EMERGING

Martial arts can improve wellbeing and self-control, but not automatically. Meta-analyses find benefits for wellbeing and internalizing problems (Moore et al., 2020) and, in intervention studies with youth, reduced aggression (Harwood et al., 2017). Other meta-analytic and longitudinal evidence finds no benefit or even harm, especially with intense training and "macho" cultures (Gubbels et al., 2016; Endresen & Olweus, 2005). Training that explicitly includes ethical and psychological teaching appears more beneficial (Trulson, 1986).

The solo practitioner's burden

This research has a pointed implication for the System of Inevitability. "No instructors required. No belts." That is a liberating idea for conditioning and skill. But in the studies above, the instructor and the training culture seem to be among the main channels through which martial arts' good effects, or bad ones, are delivered. A solitary practitioner has no teacher to model restraint, no community to frown at bravado, and no tradition to remind them what the skill is for.

That means the practitioner has to supply those things themselves. This book suggests four:

1. **A purpose.** Decide, in writing, why you train. "To protect myself and others when there is truly no other option, and to become calmer, stronger, and more aware" is a purpose. "To dominate" is not.

2. **A code.** Adopt explicit rules for the use of force (below), and review them regularly.
3. **A witness.** Train sometimes with others, and invite feedback not only on technique but on attitude.
4. **A practice of restraint.** Train walking away, speaking calmly, and stepping back as deliberately as you train striking.

De-escalation is a skill, and it can be trained

The most important "technique" in self-protection is not a strike. It is the ability to keep a situation from becoming a fight. Here, too, there is research.

A systematic review of 64 evaluations of de-escalation training, mostly in nursing and psychiatry, found that such training generally led to slight-to-moderate improvements with few adverse effects, though the quality of most studies was weak (Engel et al., 2020). Then came a stronger test. In a stepped-wedge randomized trial with a large city police department, a de-escalation training programme was followed by a 28% reduction in use-of-force incidents, a 26% reduction in injuries to citizens, and a 36% reduction in injuries to officers (Engel et al., 2022).

In another study, police officers who received a self-defence training that trained complete violent situations, not just physical skills, improved in communication, situational awareness, assertiveness, proportionality, and control. They "learned to use their actions before physical contact for de-escalation" (Renden et al., 2017).

> ◐ EVIDENCE: SUGGESTIVE · EMERGING
>
> **De-escalation training can reduce force and injuries.** A randomized stepped-wedge trial in a police department found large reductions in use of force and in injuries to both citizens and officers after de-escalation training (Engel et al., 2022). Earlier evidence was mostly of low quality (Engel et al., 2020). Scenario-based training that includes communication improved officers' proportionality and de-escalation (Renden et al., 2017).

The same lesson comes from research on self-defence for women. In a large randomized trial at three Canadian universities, a programme teaching women to assess risk from acquaintances, overcome emotional barriers to acknowledging danger, and use verbal and physical self-defence cut the one-year risk of completed rape almost in half, from 9.8% to 5.2% (Senn et al., 2015). A study of a feminist self-defence class found that participants were less likely to experience sexual assault over the following year and more confident in their ability to resist (Hollander, 2014). In both, the physical skills were only one part of a package built on awareness, recognition, and assertiveness.

Rules for the use of force

This book is not legal advice, and laws differ greatly between countries and states. Learn the law where you live from a qualified source. But the following principles, which are the compiler's suggestions, reflect a broad ethical consensus and the spirit of most self-defence law:

- **Avoid.** The best fight is the one you are not in. Leave early. Cross the street. Let insults go.
- **De-escalate.** Speak calmly, keep your hands open and visible, create distance, offer a way out.
- **Only when necessary.** Use physical force only when there is an immediate threat of harm to you or someone else and no safer option exists.
- **Only as much as necessary.** Use the least force that will stop the threat, and stop when it stops. A strike to escape is not a licence for a "micro-vortex" of five more.
- **Never as punishment, revenge, display, or test.** Testing your system on strangers is assault.
- **Afterwards, care.** Get to safety, call for help, seek medical attention for anyone injured, and tell the truth.

> ⚠ CAUTION
>
> **A note on the micro-vortex.** A sequence designed to deliver four or five impacts to the same spot in under a second, if it works as described, is a sequence that can easily exceed what is necessary to stop a threat. Its automaticity (Chapter 6) makes this worse: a chunk, once started, is hard to stop. If you practise it, practise *stopping it* at every stage, on a cue, as diligently as you practise running it.

The people who train with you

A training partner who lets you strike near their face, or who resists you so that you can learn, is extending you an extraordinary trust. Sociologists of combat sports have described how practitioners manage risk through reflexivity and **collaboration**: the shared work of keeping a dangerous activity safe enough to learn from (Channon, 2020).

Some non-negotiables, again the compiler's suggestions:

- **Agree intensity before every round**, and keep to it. If you want more, ask.
- **Control beats power.** In partner work, the measure of skill is placing a strike precisely at an agreed intensity, not hitting hard.
- **Protect heads.** No hard strikes to the head or neck in training, ever. Use headgear and gloves when any head contact is involved, and treat any suspected concussion as a reason to stop for the day and seek medical advice.
- **Have a stop word and a tap**, and honour them instantly.
- **Partners are not test dummies.** The metal-armed dummy is for full-force work. People are not.

The upgrade

So what does an upgrade in consciousness look like, in a person who trains to strike?

It looks like someone who can feel anger rise and watch it, the way they watch their breath, without being carried away by it. Someone who reads a room accurately, because their training taught them to read people, and who

uses that skill to see trouble coming and step aside. Someone whose calm under pressure makes them the person others look to in an emergency. Someone who is gentle with weaker people because they have nothing to prove. Someone whose training partners trust them completely. Someone who could strike, and doesn't.

None of that requires metaphysics. Every element of it has been touched, at least, by the research in this book: on attention and interoception, on calm under stress, on de-escalation, on the training cultures that make martial artists better or worse. It is an upgrade worth wanting, and it is available to anyone willing to practise it as seriously as they practise the fist.

Could strike. Doesn't. That is the whole of the art.

CHAPTER 12

The Safe Path for the Hand



Bone and tendon keep their own calendar. They will not be hurried.

This chapter offers a suggested, conservative progression for training the bent fist, the wave, and the micro-vortex. It is the compiler's suggestion, drawn from the general literature on tissue adaptation, injury, and motor learning. It is **not** Uki's teaching, it has not been tested as a programme, and it does not replace a qualified coach, physiotherapist, or physician. Book 1 contains a similar progression for the iron balls and ring bar, and the two can be combined, but never increase load in both at once.

> ⚠ CAUTION
>
> **See a professional first** if you have ever broken a bone in your hand or wrist, have wrist or elbow pain, numbness or tingling in your fingers, arthritis, osteoporosis or low bone density, a bleeding disorder, high blood pressure, heart disease, or eye problems, or if you are pregnant or take blood thinners. Striking is a high-impact activity for the hand, and heavy straining raises blood pressure (Chapter 7).

Five principles

1. The hand adapts slowly. Bone responds to loading, but on a scale of months and years. Studies of racquet and throwing athletes show that their loaded arms develop larger and stronger bones than their non-loaded arms, and that bone *shape and size*, not just density, change (Bass et al., 2002; Warden et al., 2014). Both studies also show that bone is most responsive to loading during youth;

adults should expect slower and smaller gains. Tendons and ligaments adapt more slowly still: tendon stiffness changes in training studies lasting at least eight weeks, and the core of an adult tendon renews itself very little (Bohm et al., 2015; Magnusson & Kjaer, 2019). Your striking surfaces will become more robust if you load them gradually, over many months. They will break if you hurry.

2. Short bouts, separated by rest. In a classic study in rats, the same daily number of loading cycles built stronger bone when split into four short bouts separated by hours than when given all at once (Robling et al., 2002). Bone cells desensitize to repeated loading and need time to recover their sensitivity. Researchers have used findings like this to suggest that exercise for bone should use brief, dynamic loading sessions with rest between them (Turner & Robling, 2003). Translated loosely to the hand: several short, light contact sessions a week are likely better than one long, hard one.

3. Avoid load spikes. Rapid increases in training load are a common contributor to injury, while gradually built capacity is protective (Gabbett, 2016). Increase *one* variable at a time: force, *or* duration, *or* target hardness, *or* speed, and by small steps.

4. Protect the hand, and the wrist behind it. Hand protection reduces hand injury in martial arts and boxing (Diesselhorst et al., 2013; Drury et al., 2017). Wraps and gloves are not a weakness. They are what elite boxers wear, and even elite boxers injure their hands (Loosemore et al., 2015).

5. Structure before speed, speed before power. Learn to hold the wrist aligned and the fist buttressed at the moment of contact slowly and lightly, before adding speed. Add speed before adding force. The "lock at impact" of "rock in a sock" (Chapter 5) must be automatic before you hit anything hard.

● EVIDENCE: WELL-ESTABLISHED

Gradual loading builds tissue; spikes break it. Bone and tendon adapt to progressive loading over months (Warden et al., 2014; Bohm et al., 2015). In rats, loading divided into short bouts with rest built stronger bone than the same load given at once (Robling et al., 2002). Rapid load increases are associated with injury (Gabbett, 2016).

About "hand conditioning"

Some martial traditions practise hand conditioning by repeatedly striking hard objects until calluses form. An early medical report on serious karate hand-conditioners found no X-ray evidence of damage to the knuckle bones in a small number of practitioners, but described a "savage technique" in which a callus is built over deliberately damaged tissue, and concluded that serious hand-conditioning was unnecessary for competition and "not recommended" (Larose & Sik, 1969). That study is old and tiny. Modern evidence about *bone* suggests a better route: moderate, progressive, dynamic loading with rest, rather than damage and repair.

The System of Inevitability's metal-armed dummy, with arms of Schedule 40 steel pipe, provides exactly the "hard, unyielding feedback" the project materials praise. That is also what makes it dangerous to the unprepared. Steel does not yield; your hand must. **The metal-armed dummy is the last tool in this progression, not the first.**

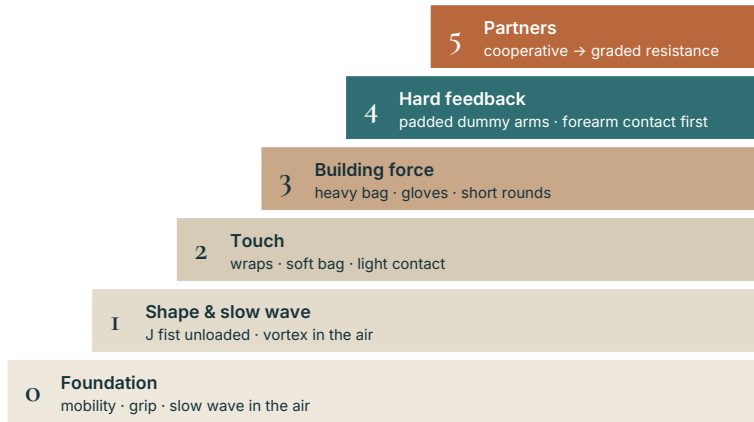
A suggested progression

Stage	Hand & wrist	Striking work	Contact & target	Ready to progress when…
0. Foundation (4+ weeks)	Wrist circles and flexion/extension through comfortable range; light grip and forearm work; practise a tight, buttressed conventional fist	Slow whole-body wave in the air: ground, hips, trunk, arm, with breath	None	Full, pain-free wrist range; fist closes tightly without discomfort; no morning stiffness
1. Shape & slow wave (4–8 weeks)	Form the J fist gently, unloaded; hold 5–10 s, release; compare its grip with a neutral fist	Single-arm micro-vortex in the air, very slow, each station held briefly to check structure	None: air only	Can run the sequence slowly for 2–3 minutes per arm with wrist and elbow positions consistent on video
2. Touch (6–12 weeks)	Wraps; static press of fist, hammerfist, and forearm into a soft bag, building to moderate pressure	Light-touch strikes on a soft bag: conventional fist and hammerfist first, J fist last	Soft or water bag; wraps and bag gloves	No pain during or next morning; alignment holds on video at about half speed

Stage	Hand & wrist	Striking work	Contact & target	Ready to progress when…
3. Building force (3–6 months)	Continue grip and forearm strength; monitor knuckles and wrist weekly	Bag work at gradually increasing speed, then force; single-arm vortex at moderate intensity, short rounds	Freestanding heavy bag; wraps, gloves for J-fist work	4+ weeks of moderate bag work with no symptoms; baseline tests stable (Appendix A)
4. Hard feedback (after 6+ months)	Forearm and ulnar-border contact only, at first	Alignment and rebound drills on the dummy: forearm, hammerfist, elbow *contact*, not full-force fist strikes	Dummy arms padded with foam at first; bare steel only for light, controlled contact	Months of pain-free padded work; no knuckle or wrist changes
5. Partners (Chapter 13)	—	Cooperative drills at agreed intensity, then graded resistance	Gloves; headgear for any head contact	Partner trust, control, and the rules in Chapter 11

These durations are minimums, not targets. If you are older, new to training, or have any history of hand injury, stay longer at each stage. If anything in a stage hurts, go back a stage.

The safe path for the hand



Weeks to months at each step. Any hand symptom: step back down. The bare steel dummy comes last, not first.

A suggested progression for the hand, from foundation to partner work. Each step is a minimum of weeks to months, and any symptom means stepping back down.

Stop rules

1. **Sharp or localized pain** in a knuckle, hand bone, wrist, or elbow, during or after striking.
2. **Swelling, bruising, or a knuckle that looks different**, sits lower, or is tender to press. A depressed knuckle after a punch can mean a boxer's fracture. Stop and get it examined.
3. **Pain on the little-finger side of the wrist**, or a click or clunk in the wrist.
4. **Numbness, tingling, or weakness** in the fingers, especially at night. Bent-wrist positions raise pressure in the carpal tunnel (Weiss et al., 1995).
5. **Pain that is worse the next morning** than before you trained, or above about 3 out of 10 during training.
6. **Fatigue that degrades alignment.** When the wrist starts to wobble at contact, the session is over.
7. **Any blow to your head or face**, or any symptom of concussion in you or a partner: headache, dizziness, confusion, nausea, blurred vision. Stop for the day and seek medical advice.
8. **Chest pain, unusual breathlessness, palpitations, or faintness.** Stop and seek medical attention.

If symptoms persist for more than a few days, or return every time you train, see a physician or hand therapist. Do not train through hand pain. Small hand injuries, ignored, become permanent ones.

Warm-up and session shape

Warming up improves performance in most studies (Fradkin et al., 2010), and for the hand it is also a daily check-in. A suggested session:

1. **Breath and check-in** (2 min): slow, long-exhale breathing (Chapter 7). Open and close each hand slowly; press each knuckle; note anything new.
2. **Mobility** (5 min): wrist circles, gentle flexion and extension, forearm rotation, shoulder circles, walking and turning (Book 1's foundation).

3. **Slow wave** (5 min): the whole-body wave in the air, then the micro-vortex very slowly on each side.
4. **Main work** (10–20 min): the stage-appropriate work from the table, in short rounds of one to two minutes with rest between. Stop each round *before* form fades.
5. **Stop practice** (2 min): run the micro-vortex and stop it on a cue at each station (Chapter 11).
6. **Cool-down** (3 min): slow breathing; note how quickly heart rate settles; log the session (Appendix A).

Simple self-tests

Every four to six weeks, record the following. Use the same equipment, warm-up, and time of day each time, and remember that the first few tests mostly measure learning the test (Dunn et al., 2019).

- **Grip strength, neutral and flexed.** With a hand dynamometer, record your best of three squeezes with the wrist in its natural position and again with the wrist held in your J-fist flexion. The ratio tells you how much clench the J posture costs you (O'Driscoll et al., 1992), and whether conditioning changes it.
- **Pain-free wrist range.** Note the range of flexion and extension you can reach comfortably, and any pain.
- **Knuckle check.** Look at and press each knuckle. Photograph your hands, flat and in a fist, from the same angle, each time.
- **Filmed micro-vortex.** Record 10 seconds of the sequence on a bag, from the side, with a phone's slow-motion mode, and count clean impacts and alignment at each contact (Chapter 13).

Train the hand for the decades, not the season.

CHAPTER 13

How to Test It



Full viability as a transmissible system requires progressive pressure-testing, filmed standards, and outcome data.

— FROM THE SYSTEM OF INEVITABILITY SOURCE MATERIALS, MAY 2026

The System of Inevitability's own materials say it plainly: to become more than a personal conditioning practice, it needs **pressure-testing, filmed standards, and outcome data**. The October 2026 viability assessment reached the same conclusion. This chapter is a practical guide to producing those things, honestly and safely, with equipment most people already own. It is offered in the spirit of the system's own phrase: *the tools, the physics, and the will to train*, and, it might be added, the will to find out.

Why feelings and ratings are not enough

Every practitioner knows what it is like to feel that a technique *works*. That feeling is valuable; it is often how good ideas are discovered. But it is not evidence, for three well-documented reasons.

We overrate ourselves. In a famous series of studies, people who scored in the bottom quarter on tests of logic, grammar, and humour estimated their performance at around the 62nd percentile, when it was actually around the 12th. The skills needed to perform well are often the same skills needed to recognize good performance (Kruger & Dunning, 1999). A solitary practitioner, with no opponent and no teacher, is especially exposed to this.

Expectation changes performance. Placebo effects of varying size have been reported across sports, from weightlifting to endurance cycling, driven by expectation, motivation, and conditioning (Beedie & Foad, 2009). Someone who believes a technique is superior may genuinely perform it better, or rate it more highly, for reasons that have nothing to do with the technique.

Traditions can mislead their members. An anthropologist who has done fieldwork on martial arts since 2001, including seni silat, discusses an "infinity loop" model in which a practice's real-world efficacy and its performance as display feed each other, and what happens when the two collide: misframing, captivation, and "false connections," in which confounded variables give rise to new beliefs (Farrer, 2015).

The numerical ratings in the source conversation (9.6 out of 10 for the system, 9.1 compared with elite military close-quarters systems) belong in this category. They are impressions produced in a conversation with an AI system, not measurements. They could not be anything else, because no one has yet measured anything. The good news is that measuring is not hard.

> ● EVIDENCE: WELL-ESTABLISHED
>
> **Self-assessment is unreliable; expectation matters.** People tend to overestimate their own competence, especially when less skilled (Kruger & Dunning, 1999). Expectations can produce placebo effects on sports performance (Beedie & Foad, 2009). This is why claims need external, repeatable measurement.

Five rules for a fair test

1. **State the claim precisely.** "The J fist is superior" cannot be tested. "On a heavy bag, my J-fist straight strike moves the bag farther than my conventional straight punch, at the same effort" can.
2. **Compare with something.** A number means little alone. Test the system's technique against a conventional alternative, performed by the same person, on the same day, on the same target.
3. **Repeat.** Single trials are noise. Measurement scientists recommend at least three trials when estimating reliability, and warn that systematic changes

between trials, such as learning or fatigue, must be separated from random variation (Hopkins, 2000). In one boxing study, punch-force measurements became more consistent on the second testing day, suggesting a learning effect, and the authors recommended repeated familiarization (Dunn et al., 2019). Report the typical variation between your trials, not just your best one (Atkinson & Nevill, 1998).

4. **Blind what you can.** Randomize the order of conditions. If someone else scores the videos, don't tell them which condition they are watching.
5. **Write it down and share it,** including the results you didn't want.

The test kit

You do not need a laboratory to begin:

- **A phone with slow-motion video.** An app using a phone's high-speed video to time jump flight agreed almost perfectly with a laboratory force platform (Balsalobre-Fernández et al., 2015). Counting impacts and checking wrist alignment frame by frame is a simpler task.
- **A tripod or stack of books**, so that every recording is from the same position.
- **A hand dynamometer** for grip strength (Chapter 12).
- **A heart-rate monitor**, if you have one.
- **Optionally, an accelerometer.** Many phones and inexpensive sensors can record acceleration. A systematic review found inertial sensors increasingly used to measure strike quality in combat sports, but noted that methods are often ad hoc, so keep your method identical between sessions (Worsey et al., 2019).
- **Optionally, a striking dynamometer** at a gym or university. Purpose-built devices can discriminate elite, intermediate, and novice punchers reliably (Smith et al., 2000), and reviews describe best practice for using them (Lenetsky et al., 2022).

Six solo tests

Test 1: Cadence. *Claim: the micro-vortex produces 4–5 impacts in under a second.* Film the single-arm sequence on a heavy bag from the side in slow motion. In editing software or frame by frame, count the impacts in each one-second window, and note which impacts were "clean" (wrist aligned, contact on the intended surface). Do five trials per arm. Report the average and range.

Test 2: Impact comparison. *Claim: the J fist delivers more effective impacts than a conventional fist.* With the same bag, distance, and stance, alternate in random order between conventional straight punches, J-fist straight strikes, and hammerfists, at the same perceived effort. Measure the bag's swing on video (mark a scale on the wall behind it), or its peak acceleration with a sensor taped to the bag. Five to ten strikes per condition, repeated on three separate days. Record any pain for each condition.

Test 3: Grip cost. *Question: how much clench does the J posture cost?* Measure grip strength with the wrist neutral and in J-fist flexion (Chapter 12). The ratio is a simple, repeatable number that conditioning may or may not change.

Test 4: Alignment standard. *Question: does structure hold at contact?* Film the side view of each strike type at three speeds. Have a second person rate wrist and elbow alignment at the frame of contact on a simple five-point scale, a method like the one validated for police self-defence skills (Nieuwenhuys et al., 2009). Two raters who agree are far more convincing than one.

Test 5: Economy. *Claim: the system approaches "zero wasted motion."* For two-minute rounds, compare the micro-vortex with an ordinary punching combination that delivers the same number of impacts. Record heart rate and your rating of perceived effort at the end of each round. In fitness boxing, faster punching tempos raised heart rate and perceived effort (Kravitz et al., 2003); a genuinely more economical pattern should produce the same impacts at lower cost.

Test 6: The stop test. *Question: can the sequence be interrupted?* A partner or a phone app gives a random sound cue while you run the micro-vortex. Film it and count how many frames it takes to stop cleanly. This tests the restraint skill from Chapter 11, and it is as important as any test of power.

> ○ PRACTITIONER EXPERIENCE · PHILOSOPHY
>
> **These tests are suggestions.** They are the compiler's designs, based on general measurement principles, not validated protocols. Their value lies in being simple, repeatable, filmed, and shared. If a qualified researcher wants to do better, so much the better.

Filmed standards

A belt system tells you that a teacher approved of you. A **filmed standard** tells everyone exactly what you can do. The system's materials call for filmed standards, and they are a natural fit for a practice with "no instructors" and "no belts."

A good standard has four parts:

1. **A defined task**, such as "single-arm micro-vortex on a heavy bag, 30 seconds per arm."
2. **Defined criteria**, such as "at least 80% of contacts rated aligned by two raters; no visible wrist collapse; clean stop within a set number of frames on cue."
3. **A fixed recording method**: camera height, distance, angle, frame rate.
4. **Public, dated video**, so that others can check and compare.

Standards like these could be the beginning of what the viability assessment called a "transmissible" system: not a hierarchy, but a shared, visible record of what the practice produces.

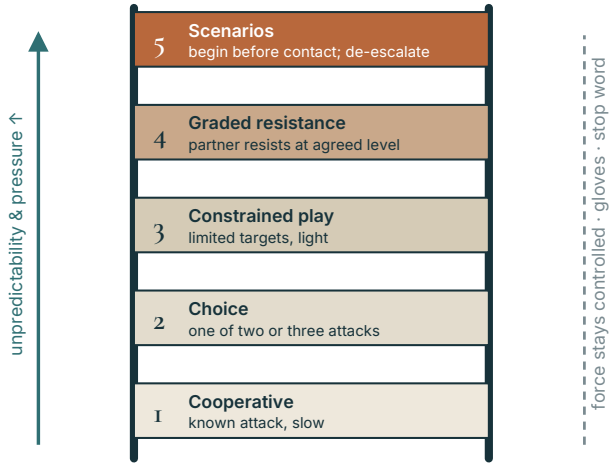
Partner pressure-testing: a ladder

Solo tests can answer questions about speed, alignment, and cost. They cannot answer the questions that matter most in a martial system: does it work against a person, and does it survive pressure? Chapters 9 and 10 explained why: expertise in fighting is perceptual and interactive (Krabben et al., 2019; Mori et al., 2002), solo practice differs from sparring (Kirk et al., 2015), and skill degrades under

pressure unless it is trained under pressure (Nieuwenhuys et al., 2009; Oudejans, 2008).

Here is a suggested ladder. Climb it slowly, with gloves, headgear for any head contact, a stop word, and the partner rules of Chapter 11.

The pressure-testing ladder



A ladder of pressure-testing, from cooperative drills to scenario training. Each rung adds unpredictability or resistance, never uncontrolled force. Schematic.

1. **Cooperative.** Partner holds pads or feeds a known, slow attack; you apply the technique. Goal: structure and timing with a moving person.
2. **Choice.** Partner feeds one of two or three attacks at random. Goal: reading cues, not executing a plan.
3. **Constrained play.** Light, flowing exchanges with limited targets (for example, body only, no head) and agreed intensity. Goal: adaptation against someone who also adapts.
4. **Graded resistance.** Partner resists and counters at an agreed level that rises over weeks. Goal: does the method still function when the other person is trying to stop it?

5. **Scenarios.** Realistic situations that begin *before* contact, with verbal de-escalation, avoidance, and the option, often the right one, of not striking at all. In a police study, training that rehearsed complete violent situations, including the moments before physical contact, improved officers' performance in reality-based scenarios, with better communication, situational awareness, proportionality, and control (Renden et al., 2017). Goal: decisions under pressure.

At each rung, collect **outcome data**: how often the technique succeeds; independent ratings of video; and partners' own reports. To test "psychological inevitability," ask partners after each round, without telling them what you are testing, how predictable your movements felt on a simple scale. If the system makes you hard to read, it will show.

> ⚠ CAUTION
>
> **Pressure-testing is not permission to hurt people.** The point is to raise unpredictability and psychological pressure, not to raise force. Never test on unconsenting people. Never test with full-force strikes to the head or neck. A test that injures a partner has failed, whatever else it showed.

Sharing the results

The final step is the one most often skipped. Share what you find, including the disappointing results, under an open license like this book's. A dozen practitioners who each film and share their cadence, alignment, and comparison tests would, between them, create the first real data set on this system. A university biomechanics lab, offered a willing group of practitioners and a clear question, might do the rest.

That is how a personal practice becomes a contribution to human knowledge. It is also, in a quiet way, part of the upgrade this series hopes for: the willingness to put a cherished idea to the test, and to be glad of the answer, whatever it is.

The most inevitable thing about any idea is that, sooner or later, reality tests it. Better to do it yourself, kindly and carefully.

CHAPTER 14

Wave and Return



The cycle completes and restarts.

— FROM THE DESCRIPTION OF THE MICRO-VORTEX

Make a fist. Not hard; just close your hand. Now let your wrist curl gently forward until the knuckles bow toward your forearm, into the shape this book has called the J fist. Feel the tendons on the back of your wrist lengthen, the little-finger edge of your hand line up with the bone of your forearm. Breathe out slowly.

Now open your hand.

That opening is where this book ends, and where, in a sense, every chapter has been pointing.

What we have learned

This book has tried to treat an unusual martial idea with both respect and honesty. Here is what the evidence supports:

- **A closed, buttressed fist protects the hand**, and the structure of the hand, wrist, and forearm matters for how force is transmitted. Whether the System of Inevitability's bent fist is *better* than a conventional fist is untested, and bent-wrist positions carry their own costs: weaker grip and higher carpal tunnel pressure.
- **Whole-body striking really is a wave.** Skilled throws, kicks, and punches build speed from the ground up, segment by segment, and the ends of

chains, like the tip of a whip, can move very fast. Elastic tissues store and return energy. These are real mechanics, and they are what lies behind the system's language of waves, vortices, and flutter.

- **Loose, then firm, is how good strikers hit.** Elite fighters relax during the strike and stiffen at contact. "Rock in a sock" is a vivid image of a well-documented pattern.
- **Figure-eights and rhythmic cycles are natural to the motor system**, and continuous combinations are physically possible. Whether the micro-vortex delivers four or five effective impacts in under a second, on a resisting opponent, is something a phone camera can begin to answer.
- **Breath and calm can be trained**, and slow breathing affects physiology and mood. Pressure degrades skill unless skill is trained under pressure.
- **Variation and perception are at the heart of skill.** Never repeating the same strike twice has support in motor-learning research. But fighting skill lives in the interaction with another person, which solo training alone cannot supply.
- **Martial arts do not automatically make people better or worse.** What matters is how they are taught and practised: with restraint, respect, and a culture of care.

And here is what remains open: the bent fist's superiority, the system's economy, its effectiveness against resisting partners, and its "psychological inevitability." Those are not weaknesses of the book or of the system. They are its research programme.

The real return

Every strike in the micro-vortex flows back into the next. That is its beauty, and its danger: a cycle designed never to stop.

The most important skill this book can offer is the opposite: **the return to stillness**. The capacity to stop on a cue. To feel the wave rising in your body, in anger or fear, and let it settle. To walk away from a fight that does not need to happen, which is almost every fight. To open the hand.

Research on de-escalation and violence prevention points to the same lesson from every direction. The safest confrontation is the one that never escalates; the strongest person in the room is often the calmest; and the training that best prepares people for violence includes, at its centre, the words and choices that come before it.

If there is an "upgrade in human consciousness" to be found in a practice of striking, it is this: to hold real power in your hands and to become, because of it, more patient, more careful, and more kind. To be able to hurt and to choose not to. To train hard and come home whole. To help a training partner improve without injuring them. To test your beliefs and be glad to learn you were wrong.

An invitation

Train patiently. Follow the safe path. Bone and tendon keep their own calendar.

Measure honestly. Film your standards. Count your impacts. Compare. Share what you find, including what disappoints you.

Train with others. Find partners you trust, and become a partner others can trust.

Practise stopping. Every session, rehearse the most important technique in this book: the moment you choose not to strike.

Share freely. This book belongs to everyone who reads it. Give it away. Improve it. Pass it on.

The wave goes out. The wave returns.

Let what returns be gentler than what went out.

— with gratitude to Uki, for the practice and the questions it raises; to the researchers whose work is cited here, for the evidence; and to every training partner who has ever pulled a strike, for the care.

Appendix A · Test Protocols and Logs

Copy or print these pages. Fill them in honestly. Film what you can. Over time, your logs and videos will tell you more than any rating ever could.

Filming checklist

- Same camera position every time: tripod or fixed stack, at hip height, 2–3 m from the bag, side-on (90°) to the line of the strike.
- Slow-motion mode (120 fps or higher if available); good light; plain background.
- Mark a scale on the wall behind the bag (tape marks every 10 cm) for swing measurements.
- Say the date, test, and condition aloud at the start of each clip.
- Randomize the order of conditions (write them on cards and shuffle).
- Keep every clip, including the bad ones.

Self-test log (every 4–6 weeks)

Grip in kg, best of three. Impacts per second: average of five filmed one-second windows (Test 1).

Date	Grip neutral L/R	Grip J L/R	Wrist pain-free?	Knuckles OK?	Impacts per s	Clean %	Stop (frames)	Notes

Fist comparison log (Test 2)

Record bag swing (cm, from the wall scale) or peak acceleration, five trials per condition, in shuffled order.

Date	Order	Conventional	J fist	Hammerfist	Effort (1–10)	Pain (0–10)	Blind?

Economy log (Test 5)

Date	Pattern	Round length	Impacts delivered	Heart rate at end	Effort (1–10)	Heart rate 1 min after	Notes
	Microvortex	2 min					
	Conventional combination	2 min					
	Microvortex	2 min					
	Conventional combination	2 min					

Partner pressure-testing log

Date	Partner	Rung (1–5)	Intensity	Success / tries	Predict-able? (1–5)	Injury?	What I learned

Session and injury log

Date	Stage	Work done	Min	Effort (1–10)	Calm (1–10)	Pain next morning	Stopped early? Why?

Appendix B · The Evidence at a Glance

A one-page summary of the main claims discussed in this book, how strong the evidence is, and where to look. "●" marks well-established findings, "◐" suggestive or emerging ones, and "○" practitioner claims that have not been tested.

Claim	Strength	Key sources
A tightly buttressed fist stiffens the knuckles and reduces strain on hand bones	◐ Suggestive (small lab studies; interpretation debated)	Morgan & Carrier, 2013; Horns et al., 2015; Nickle & Goncharoff, 2013
Grip strength drops and carpal-tunnel pressure rises as the wrist bends away from neutral	● Well-established	O'Driscoll et al., 1992; Weiss et al., 1995
Hand and wrist injuries are the most common injuries in boxing; protection reduces risk	● Well-established	Loosemore et al., 2015, 2017; Diesselhorst et al., 2013; Drury et al., 2017
The J fist is structurally superior to the straight fist	○ Untested	System materials
Skilled striking sequences body segments proximal to distal (a "wave")	● Well-established	Putnam, 1993; Hirashima et al., 2007; Marshall & Elliott, 2000
Tendons store and return elastic energy; the stretch-shortening cycle boosts power	● Well-established	Roberts & Azizi, 2011; Komi, 2000; Roach et al., 2013
"Toroidal energy fields," "butterfly-flutter resonance," "fractal chaining"	○ Metaphor	System materials
Elite strikers relax mid-strike and stiffen at impact (double peak)	◐ Suggestive (one small study)	McGill et al., 2010
Effective mass and speed both determine impact; trained strikers couple more mass	● Well-established	Neto et al., 2007; Walilko et al., 2005; Lenetsky et al., 2015
"100% energy economy" / "zero wasted motion"	○ Untested (physically impossible as stated)	System materials

Claim	Strength	Key sources
Coordination patterns self-organize and switch abruptly	● Well-established	Haken et al., 1985; Kelso & Schöner, 1988
Practised sequences become chunks	● Well-established (general finding)	Sakai et al., 2003; Wymbs et al., 2012
4–5 impacts in under a second, with compounding resonance	○ Untested (cadence plausible; resonance unsupported)	System materials
Shouting or grunting slightly boosts force	◐ Suggestive	Welch & Tschampl, 2012; O'Connell et al., 2014
Slow breathing reduces arousal and improves mood	● Well-established for HRV; ◐ for mood	Zaccaro et al., 2018; Lehrer & Gevirtz, 2014; Balban et al., 2023
Systema breath principles and military use	○ Not studied; military claims unverified	—
Variable or random practice improves retention and transfer	● Well-established	Shea & Morgan, 1979; Hall & Magill, 1995; Wu et al., 2014
Highly variable "differential learning"	◐ Promising but debated	Tassignon et al., 2021; Schöllhorn et al., 2022
Expert fighters anticipate from early cues	● Well-established	Mori et al., 2002; Mann et al., 2007; Milazzo et al., 2016
Solo practice differs from live practice; transfer is specific	● Well-established	Kirk et al., 2015; Sala & Gobet, 2017; Pinder et al., 2011
"Psychological inevitability"	○ Untested	System materials
Pressure degrades skill; training under pressure protects it	● Well-established	Nieuwenhuys et al., 2009; Oudejans & Pijpers, 2009; Nieuwenhuys & Oudejans, 2011
Mindfulness protects attention under stress	◐ Suggestive	Jha et al., 2010; Johnson et al., 2014
Single blows to the head can kill	● Well-established	Pilgrim et al., 2014
Martial arts improve wellbeing and reduce aggression	◐ Mixed: depends on teaching and culture	Moore et al., 2020; Harwood et al., 2017; Gubbels et al., 2016
De-escalation training reduces force and injuries	◐ Promising (one strong trial)	Engel et al., 2022; Engel et al., 2020
Bone and tendon adapt to gradual loading over months; load spikes raise injury risk	● Well-established	Warden et al., 2014; Bohm et al., 2015; Gabbett, 2016

Claim	Strength	Key sources
People overrate their own competence; expectation affects performance	● Well-established	Kruger & Dunning, 1999; Beedie & Foad, 2009

Glossary

Angular velocity — How fast something rotates, measured in degrees or radians per second. The speed of a fist depends on the angular velocities of the segments behind it.

Boxer's fracture — A break in the neck of a metacarpal bone, usually the fourth or fifth, often caused by striking a hard object with a closed fist.

Buttressed fist — A fist in which the thumb wraps across the fingers, stiffening the knuckle joints so that the hand behaves more like a single rigid unit at impact.

Carpal tunnel — The passage on the palm side of the wrist through which the median nerve and finger flexor tendons run. Pressure in it rises when the wrist is strongly bent.

Chunking — The brain's grouping of a practised sequence of movements into units executed as wholes.

Constraints-led approach — A way of teaching skills by designing the task, environment, and rules so that good solutions emerge, rather than prescribing a single correct technique.

De-escalation — Words, posture, distance, and choices that reduce the intensity of a conflict and the likelihood of violence.

Differential learning — A practice method that deliberately adds large, constant variation, so that no movement is repeated exactly.

Double peak — The pattern of muscle activation seen in elite strikers: an initial burst, a period of relative relaxation as the limb accelerates, and a second burst at impact.

Effective mass — The amount of body mass that behaves as though it were rigidly coupled to the striking surface at the moment of impact.

Figure-eight (lemniscate) — A closed curve that crosses itself once, like the symbol ∞. In this book, a description of the paths of the hands and elbows in continuous striking.

Filmed standard — A defined task, criteria, and recording method, with dated public video, used to show what a practitioner can actually do.

Hammerfist — A strike with the little-finger edge of the closed fist.

HKB model — The Haken–Kelso–Bunz model of coordination, which describes how rhythmic movements settle into stable patterns and switch abruptly between them.

Impulse — Force multiplied by the time over which it acts; equal to the change in momentum it produces.

J fist (bent fist, Monyet hand) — In the System of Inevitability, a clenched fist with the wrist bent sharply toward the palm, so that the knuckles, little-finger edge, forearm, and elbow form a continuous striking surface. The name "Monyet hand" (*tangan monyet*, "monkey hand") comes from silat.

Kinetic chain — The linked sequence of body segments that transfers energy from the ground to the hand or foot.

Metacarpals — The five long bones of the hand between the wrist and the fingers. Their heads form the knuckles.

Micro-vortex — The System of Inevitability's single-arm sequence: bent-fist punch, same-spot elbow, backwards hammerfist, lateral elbow, and return to the punch.

Momentum — Mass multiplied by velocity. The quantity transferred to a target in an impact.

Placebo effect — A change in performance or symptoms caused by expectation rather than by the specific treatment or technique.

Representative design — Designing practice so that it preserves the key information of the real situation, such as a live, responsive opponent.

"Rock in a sock" — The System of Inevitability's image for a relaxed, whip-like arm that locks into structure only at impact.

Silat (pencak silat) — A family of martial arts from the Malay archipelago, including Indonesia and Malaysia.

Stretch-shortening cycle — A muscle-tendon action in which a quick stretch is immediately followed by a shortening, increasing force and power through stored elastic energy and reflexes.

Systema — A Russian martial art emphasizing breathing, relaxation, and continuous movement. Little peer-reviewed research exists on it.

Toroidal — Shaped like a torus (a doughnut). In this book, a metaphor for circulating paths of movement, not a physical energy field.

Typical error — The standard deviation of a person's repeated measurements on the same test; a simple measure of how much a result varies by chance.

Ulnar border — The little-finger edge of the hand and forearm, along the ulna bone.

References

Every reference below was checked against its Crossref record (authors, year, title, journal, and DOI), and the findings cited were checked against PubMed, publisher, or OpenAlex abstracts, in November 2026.

Adamec, J., Hofer, P., Pittner, S., Monticelli, F., Graw, M., & Schöpfer, J. (2021). Biomechanical assessment of various punching techniques. *International Journal of Legal Medicine*, *135*(3), 853–859. https://doi.org/10.1007/s00414-020-02440-8

Andersen, J. P., & Gustafsberg, H. (2016). A Training Method to Improve Police Use of Force Decision Making: A Randomized Controlled Trial. *Sage Open*, *6*(2), 2158244016638708. https://doi.org/10.1177/2158244016638708

Araújo, D., Davids, K., & Hristovski, R. (2006). The ecological dynamics of decision making in sport. *Psychology of Sport and Exercise*, *7*(6), 653–676. https://doi.org/10.1016/j.psychsport.2006.07.002

Ashker, S. E. (2011). Technical and tactical aspects that differentiate winning and losing performances in boxing. *International Journal of Performance Analysis in Sport*, *11*(2), 356–364. https://doi.org/10.1080/24748668.2011.11868555

Atkinson, G., & Nevill, A. M. (1998). Statistical Methods For Assessing Measurement Error (Reliability) in Variables Relevant to Sports Medicine. *Sports Medicine*, *26*(4), 217–238. https://doi.org/10.2165/00007256-199826040-00002

Balban, M. Y., Neri, E., Kogon, M. M., Weed, L., Nouriani, B., Jo, B., ... Huberman, A. D. (2023). Brief structured respiration practices enhance mood and reduce physiological arousal. *Cell Reports Medicine*, *4*(1), 100895. https://doi.org/10.1016/j.xcrm.2022.100895

Balsalobre-Fernández, C., Glaister, M., & Lockey, R. A. (2015). The validity and reliability of an iPhone app for measuring vertical jump performance. *Journal of Sports Sciences*, *33*(15), 1574–1579. https://doi.org/10.1080/02640414.2014.996184

Bass, S. L., Saxon, L., Daly, R. M., Turner, C. H., Robling, A. G., Seeman, E., & Stuckey, S. (2002). The Effect of Mechanical Loading on the Size and Shape of Bone in Pre-, Peri-, and Postpubertal Girls: A Study in Tennis Players. *Journal of Bone and Mineral Research*, *17*(12), 2274–2280. https://doi.org/10.1359/jbmr.2002.17.12.2274

Beedie, C. J., & Foad, A. J. (2009). The Placebo Effect in Sports Performance: A Brief Review. *Sports Medicine*, *39*(4), 313–329. https://doi.org/10.2165/00007256-200939040-00004

Beek, P. J., & Turvey, M. T. (1992). Temporal patterning in cascade juggling. *Journal of Experimental Psychology: Human Perception and Performance*, *18*(4), 934–947. https://doi.org/10.1037/0096-1523.18.4.934

Beilock, S. L., & Carr, T. H. (2001). On the fragility of skilled performance: What governs choking under pressure? *Journal of Experimental Psychology: General*, *130*(4), 701–725. https://doi.org/10.1037/0096-3445.130.4.701

Beranek, V., Stastny, P., Novacek, V., Votapek, P., & Formanek, J. (2020). Upper Limb Strikes Reactive Forces in Mix Martial Art Athletes during Ground and Pound Tactics. *International Journal of Environmental Research and Public Health*, *17*(21), 7782. https://doi.org/10.3390/ijerph17217782

Beranek, V., Stastny, P., Turquier, F., Novacek, V., & Votapek, P. (2022). Analysis of the Contact Area for Three Types of Upper Limb Strikes. *Journal of Functional Morphology and Kinesiology*, *7*(2), 50. https://doi.org/10.3390/jfmk7020050

Beránek, V., Votápek, P., & Stastny, P. (2023). Force and velocity of impact during upper limb strikes in combat sports: a systematic review and meta-analysis. *Sports Biomechanics*, *22*(8), 921–939. https://doi.org/10.1080/14763141.2020.1778075

Bernick, C., & Banks, S. (2013). What boxing tells us about repetitive head trauma and the brain. *Alzheimer's Research & Therapy*, *5*(3), 23. https://doi.org/10.1186/alzrt177

Bohm, S., Mersmann, F., & Arampatzis, A. (2015). Human tendon adaptation in response to mechanical loading: a systematic review and meta-analysis of exercise intervention studies on healthy adults. *Sports Medicine - Open*, *1*(1), 7. https://doi.org/10.1186/s40798-015-0009-9

Brick, N. E., McElhinney, M. J., & Metcalfe, R. S. (2018). The effects of facial expression and relaxation cues on movement economy, physiological, and perceptual responses during running. *Psychology of Sport and Exercise*, *34*, 20–28. https://doi.org/10.1016/j.psychsport.2017.09.009

Chaabène, H., Tabben, M., Mkaouer, B., Franchini, E., Negra, Y., Hammami, M., ... Hachana, Y. (2015). Amateur Boxing: Physical and Physiological Attributes. *Sports Medicine*, *45*(3), 337–352. https://doi.org/10.1007/s40279-014-0274-7

Channon, A. (2020). Edgework and Mixed Martial Arts: Risk, Reflexivity and Collaboration in an Ostensibly 'Violent' Sport. *Martial Arts Studies*, *9*, 6. https://doi.org/10.18573/mas.95

Channon, A., & Matthews, C. R. (2026). Theorising Violence through and within Martial Arts Studies: Violence as Violation by Intentional Force. *Martial Arts Studies*, 73–89. https://doi.org/10.18573/mas.346

Chow, J. Y., Davids, K., Button, C., Shuttleworth, R., Renshaw, I., & Araújo, D. (2007). The Role of Nonlinear Pedagogy in Physical Education. *Review of Educational Research*, *77*(3), 251–278. https://doi.org/10.3102/003465430305615

Craig, A. D. (2009). How do you feel — now? The anterior insula and human awareness. *Nature Reviews Neuroscience*, *10*(1), 59–70. https://doi.org/10.1038/nrn2555

Curran-Sills, G., & Abedin, T. (2018). Risk factors associated with injury and concussion in sanctioned amateur and professional mixed martial arts bouts in Calgary, Alberta. *BMJ Open Sport & Exercise Medicine*, *4*(1), e000348. https://doi.org/10.1136/bmjsem-2018-000348

Davis, P., Leithäuser, R. M., & Beneke, R. (2014). The Energetics of Semicontact 3 × 2-min Amateur Boxing. *International Journal of Sports Physiology and Performance*, *9*(2), 233–239. https://doi.org/10.1123/ijspp.2013-0006

Diesselhorst, M. M., Rayan, G. M., Pasque, C. B., & Peyton Holder, R. (2013). SURVEY OF UPPER EXTREMITY INJURIES AMONG MARTIAL ARTS PARTICIPANTS. *Hand Surgery*, *18*(02), 151–157. https://doi.org/10.1142/s0218810413500172

Drury, B. T., Lehman, T. P., & Rayan, G. (2017). Hand and Wrist Injuries in Boxing and the Martial Arts. *Hand Clinics*, *33*(1), 97–106. https://doi.org/10.1016/j.hcl.2016.08.004

Dunn, E. C., Humberstone, C. E., Iredale, K. F., & Blazevich, A. J. (2019). A damaging punch: Assessment and application of a method to quantify punch performance. *Translational Sports Medicine*, *2*(3), 146–152. https://doi.org/10.1002/tsm2.71

Endresen, I. M., & Olweus, D. (2005). Participation in power sports and antisocial involvement in preadolescent and adolescent boys. *Journal of Child Psychology and Psychiatry*, *46*(5), 468–478. https://doi.org/10.1111/j.1469-7610.2005.00414.x

Engel, R. S., Corsaro, N., Isaza, G. T., & McManus, H. D. (2022). Assessing the impact of de-escalation training on police behavior: Reducing police use of force in the Louisville, KY Metro Police Department. *Criminology & Public Policy*, *21*(2), 199–233. https://doi.org/10.1111/1745-9133.12574

Engel, R. S., McManus, H. D., & Herold, T. D. (2020). Does de-escalation training work?: A systematic review and call for evidence in police use-of-force reform. *Criminology & Public Policy*, *19*(3), 721–759. https://doi.org/10.1111/1745-9133.12467

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion*, *7*(2), 336–353. https://doi.org/10.1037/1528-3542.7.2.336

Farb, N., Daubenmier, J., Price, C. J., Gard, T., Kerr, C., Dunn, B. D., ... Mehling, W. E. (2015). Interoception, contemplative practice, and health. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.00763

Farrer, D. S. (2015). Efficacy and entertainment in Martial Arts Studies: anthropological perspectives. *Martial Arts Studies*, *1*, 34. https://doi.org/10.18573/j.2015.10017

Fradkin, A. J., Zazryn, T. R., & Smoliga, J. M. (2010). Effects of Warming-up on Physical Performance: A Systematic Review With Meta-analysis. *Journal of Strength and Conditioning Research*, *24*(1), 140–148. https://doi.org/10.1519/JSC.0b013e3181c643a0

Gabbett, T. J. (2016). The training—injury prevention paradox: should athletes be training smarter and harder? *British Journal of Sports Medicine*, *50*(5), 273–280. https://doi.org/10.1136/bjsports-2015-095788

Goriely, A., & McMillen, T. (2002). Shape of a Cracking Whip. *Physical Review Letters*, *88*(24), 244301. https://doi.org/10.1103/PhysRevLett.88.244301

Goyal, M., Singh, S., Sibinga, E. M. S., Gould, N. F., Rowland-Seymour, A., Sharma, R., ... Haythornthwaite, J. A. (2014). Meditation Programs for Psychological Stress and Well-being: A Systematic Review and Meta-analysis. *JAMA Internal Medicine*, *174*(3), 357. https://doi.org/10.1001/jamainternmed.2013.13018

Gubbels, J., van der Stouwe, T., Spruit, A., & Stams, G. J. J. M. (2016). Martial arts participation and externalizing behavior in juveniles: A meta-analytic review. *Aggression and Violent Behavior*, *28*, 73–81. https://doi.org/10.1016/j.avb.2016.03.011

Hagins, M., Pietrek, M., Sheikhzadeh, A., Nordin, M., & Axen, K. (2004). The Effects of Breath Control on Intra-Abdominal Pressure During Lifting Tasks. *Spine*, *29*(4), 464–469. https://doi.org/10.1097/01.BRS.0000092368.90019.D8

Haken, H., Kelso, J. A. S., & Bunz, H. (1985). A theoretical model of phase transitions in human hand movements. *Biological Cybernetics*, *51*(5), 347–356. https://doi.org/10.1007/BF00336922

Hall, K. G., & Magill, R. A. (1995). Variability of Practice and Contextual Interference in Motor Skill Learning. *Journal of Motor Behavior*, *27*(4), 299–309. https://doi.org/10.1080/00222895.1995.9941719

Harwood, A., Lavidor, M., & Rassovsky, Y. (2017). Reducing aggression with martial arts: A meta-analysis of child and youth studies. *Aggression and Violent Behavior*, *34*, 96–101. https://doi.org/10.1016/j.avb.2017.03.001

Henz, D., & Schöllhorn, W. I. (2016). Differential Training Facilitates Early Consolidation in Motor Learning. *Frontiers in Behavioral Neuroscience*, *10*. https://doi.org/10.3389/fnbeh.2016.00199

Hirashima, M., Kudo, K., Watarai, K., & Ohtsuki, T. (2007). Control of 3D Limb Dynamics in Unconstrained Overarm Throws of Different Speeds Performed by Skilled Baseball Players. *Journal of Neurophysiology*, *97*(1), 680–691. https://doi.org/10.1152/jn.00348.2006

Hollander, J. A. (2014). Does Self-Defense Training Prevent Sexual Violence Against Women? *Violence Against Women*, *20*(3), 252–269. https://doi.org/10.1177/1077801214526046

Hopkins, W. G. (2000). Measures of Reliability in Sports Medicine and Science. *Sports Medicine*, *30*(1), 1–15. https://doi.org/10.2165/00007256-200030010-00001

Horns, J., Jung, R., & Carrier, D. R. (2015). In vitrostrain in human metacarpal bones during striking: testing the pugilism hypothesis of hominin hand evolution. *Journal of Experimental Biology*, *218*(20), 3215–3221. https://doi.org/10.1242/jeb.125831

Hussain, M. H., Ghaffar, A., Choudry, Q., Iqbal, Z., & Khan, M. N. (2020). Management of Fifth Metacarpal Neck Fracture (Boxer's Fracture): A Literature Review. *Cureus*. https://doi.org/10.7759/cureus.9442

Jha, A. P., Stanley, E. A., Kiyonaga, A., Wong, L., & Gelfand, L. (2010). Examining the protective effects of mindfulness training on working memory capacity and affective experience. *Emotion*, *10*(1), 54–64. https://doi.org/10.1037/a0018438

Johnson, D. C., Thom, N. J., Stanley, E. A., Haase, L., Simmons, A. N., Shih, P.-a. B., ... Paulus, M. P. (2014). Modifying Resilience Mechanisms in At-Risk Individuals: A Controlled Study of Mindfulness Training in Marines Preparing for Deployment. *American Journal of Psychiatry*, *171*(8), 844–853. https://doi.org/10.1176/appi.ajp.2014.13040502

Jöris, H. J. J., Edwards van Muyen, A. J., van Ingen Schenau, G. J., & Kemper, H. C. G. (1985). Force, velocity and energy flow during the overarm throw in female handball players. *Journal of Biomechanics*, *18*(6), 409–414. https://doi.org/10.1016/0021-9290(85)90275-1

Kelso, J. A. S., & Schöner, G. (1988). Self-organization of coordinative movement patterns. *Human Movement Science*, *7*(1), 27–46. https://doi.org/10.1016/0167-9457(88)90003-6

Kirk, C., Hurst, H., & Atkins, S. (2015). Comparison of the Training Loads of Mixed Martial Arts Techniques in Isolated Training and Open Sparring. *Journal of Combat Sports and Martial Arts*, *6*(1), 15–20. https://doi.org/10.5604/20815735.1174226

Komi, P. V. (2000). Stretch-shortening cycle: a powerful model to study normal and fatigued muscle. *Journal of Biomechanics*, *33*(10), 1197–1206. https://doi.org/10.1016/S0021-9290(00)00064-6

Krabben, K., Orth, D., & van der Kamp, J. (2019). Combat as an Interpersonal Synergy: An Ecological Dynamics Approach to Combat Sports. *Sports Medicine*, *49*(12), 1825–1836. https://doi.org/10.1007/s40279-019-01173-y

Kravitz, L., Greene, L., Burkett, Z., & Wongsathikun, J. (2003). Cardiovascular Response to Punching Tempo. *Journal of Strength and Conditioning Research*, *17*(1), 104–108. https://doi.org/10.1519/1533-4287(2003)017<0104:crtpt2.0.co;2>

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, *77*(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

Lakes, K. D., & Hoyt, W. T. (2004). Promoting self-regulation through school-based martial arts training. *Journal of Applied Developmental Psychology*, *25*(3), 283–302. https://doi.org/10.1016/j.appdev.2004.04.002

Larose, J. H., & Sik, K. D. (1969). Karate hand-conditioning. *Medicine & Science in Sports & Exercise*, *1*(2), 95–98. https://doi.org/10.1249/00005768-196906000-00008

Lehrer, P. M., & Gevirtz, R. (2014). Heart rate variability biofeedback: how and why does it work? *Frontiers in Psychology*, *5*. https://doi.org/10.3389/fpsyg.2014.00756

Lenetsky, S., Brughelli, M., Nates, R. J., Neville, J. G., Cross, M. R., & Lormier, A. V. (2020). Defining the Phases of Boxing Punches: A Mixed-Method Approach. *Journal of Strength and Conditioning Research*, *34*(4), 1040–1051. https://doi.org/10.1519/JSC.0000000000002895

Lenetsky, S., Harris, N., & Brughelli, M. (2013). Assessment and Contributors of Punching Forces in Combat Sports Athletes: Implications for Strength and Conditioning. *Strength & Conditioning Journal*, *35*(2), 1–7. https://doi.org/10.1519/SSC.0b013e31828b6c12

Lenetsky, S., Nates, R. J., Brughelli, M., & Harris, N. K. (2015). Is effective mass in combat sports punching above its weight? *Human Movement Science*, *40*, 89–97. https://doi.org/10.1016/j.humov.2014.11.016

Lenetsky, S., Uthoff, A., Coyne, J., & Cronin, J. (2022). A Review of Striking Force in Full-Contact Combat Sport Athletes: Methods of Assessment. *Strength & Conditioning Journal*, *44*(1), 71–83. https://doi.org/10.1519/SSC.0000000000000643

Loosemore, M., Lightfoot, J., Gatt, I., Hayton, M., & Beardsley, C. (2017). Hand and Wrist Injuries in Elite Boxing: A Longitudinal Prospective Study (2005-2012) of the Great Britain Olympic Boxing Squad. *HAND*, *12*(2), 181–187. https://doi.org/10.1177/1558944716642756

Loosemore, M., Lightfoot, J., Palmer-Green, D., Gatt, I., Bilzon, J., & Beardsley, C. (2015). Boxing injury epidemiology in the Great Britain team: a 5-year surveillance study of medically diagnosed injury incidence and outcome. *British Journal of Sports Medicine*, *49*(17), 1100–1107. https://doi.org/10.1136/bjsports-2015-094755

Lystad, R. P., Gregory, K., & Wilson, J. (2014). The Epidemiology of Injuries in Mixed Martial Arts: A Systematic Review and Meta-analysis. *Orthopaedic Journal of Sports Medicine*, *2*(1), 2325967113518492. https://doi.org/10.1177/2325967113518492

MacDougall, J. D., Tuxen, D., Sale, D. G., Moroz, J. R., & Sutton, J. R. (1985). Arterial blood pressure response to heavy resistance exercise. *Journal of Applied Physiology*, *58*(3), 785–790. https://doi.org/10.1152/jappl.1985.58.3.785

Magnusson, S. P., & Kjaer, M. (2019). The impact of loading, unloading, ageing and injury on the human tendon. *The Journal of Physiology*, *597*(5), 1283–1298. https://doi.org/10.1113/JP275450

Mann, D. T. Y., Williams, A. M., Ward, P., & Janelle, C. M. (2007). Perceptual-Cognitive Expertise in Sport: A Meta-Analysis. *Journal of Sport and Exercise Psychology*, *29*(4), 457–478. https://doi.org/10.1123/jsep.29.4.457

Marshall, R. N., & Elliott, B. C. (2000). Long-axis rotation: The missing link in proximal-to-distal segmental sequencing. *Journal of Sports Sciences*, *18*(4), 247–254. https://doi.org/10.1080/026404100364983

Masters, R. S. W. (1992). Knowledge, knerves and know-how: The role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology*, *83*(3), 343–358. https://doi.org/10.1111/j.2044-8295.1992.tb02446.x

McGill, S. M., Chaimberg, J. D., Frost, D. M., & Fenwick, C. M. J. (2010). Evidence of a Double Peak in Muscle Activation to Enhance Strike Speed and Force: An Example With Elite Mixed Martial Arts Fighters. *Journal of Strength and Conditioning Research*, *24*(2), 348–357. https://doi.org/10.1519/JSC.0b013e3181cc23d5

McMillen, T., & Goriely, A. (2003). Whip waves. *Physica D: Nonlinear Phenomena*, *184*(1-4), 192–225. https://doi.org/10.1016/S0167-2789(03)00221-5

Milazzo, N., Farrow, D., Ruffault, A., & Fournier, J. F. (2016). Do karate fighters use situational probability information to improve decision-making performance during on-mat tasks? *Journal of Sports Sciences*, *34*(16), 1547–1556. https://doi.org/10.1080/02640414.2015.1122824

Moore, B., Dudley, D., & Woodcock, S. (2020). The effect of martial arts training on mental health outcomes: A systematic review and meta-analysis. *Journal of Bodywork and Movement Therapies*, *24*(4), 402–412. https://doi.org/10.1016/j.jbmt.2020.06.017

Morgan, M. H., & Carrier, D. R. (2013). Protective buttressing of the human fist and the evolution of hominin hands. *Journal of Experimental Biology*, *216*(2), 236–244. https://doi.org/10.1242/jeb.075713

Mori, S., Ohtani, Y., & Imanaka, K. (2002). Reaction times and anticipatory skills of karate athletes. *Human Movement Science*, *21*(2), 213–230. https://doi.org/10.1016/S0167-9457(02)00103-3

Nakashian, M. N., Pointer, L., Owens, B. D., & Wolf, J. M. (2012). Incidence of Metacarpal Fractures in the US Population. *HAND*, *7*(4), 426–430. https://doi.org/10.1007/s11552-012-9442-0

Neto, O. P., Magini, M., & Saba, M. M. F. (2007). The Role of Effective Mass and Hand Speed in the Performance of Kung Fu Athletes Compared with Nonpractitioners. *Journal of Applied Biomechanics*, *23*(2), 139–148. https://doi.org/10.1123/jab.23.2.139

Neto, O. P., Silva, J. H., Marzullo, A. C. d. M., Bolander, R. P., & Bir, C. A. (2012). The effect of hand dominance on martial arts strikes. *Human Movement Science*, *31*(4), 824–833. https://doi.org/10.1016/j.humov.2011.07.016

Nickle, D. C., & Goncharoff, L. M. (2013). Human fist evolution: a critique. *Journal of Experimental Biology*, *216*(12), 2359–2360. https://doi.org/10.1242/jeb.084871

Nieuwenhuys, A., & Oudejans, R. R. D. (2011). Training with anxiety: short- and long-term effects on police officers' shooting behavior under pressure. *Cognitive Processing*, *12*(3), 277–288. https://doi.org/10.1007/s10339-011-0396-x

Nieuwenhuys, A., & Oudejans, R. R. D. (2012). Anxiety and perceptual-motor performance: toward an integrated model of concepts, mechanisms, and processes. *Psychological Research*, *76*(6), 747–759. https://doi.org/10.1007/s00426-011-0384-x

Nieuwenhuys, A., Caljouw, S. R., Leijsen, M. R., Schmeits, B. A. J., & Oudejans, R. R. D. (2009). Quantifying police officers' arrest and self-defence skills: Does performance decrease under pressure? *Ergonomics*, *52*(12), 1460–1468. https://doi.org/10.1080/00140130903287981

Nosanchuk, T. A. (1981). The Way of the Warrior: The Effects of Traditional Martial Arts Training on Aggressiveness. *Human Relations*, *34*(6), 435–444. https://doi.org/10.1177/001872678103400601

O'Connell, D. G., Hinman, M. R., Hearne, K. F., Michael, Z. S., & Nixon, S. L. (2014). The Effects of "Grunting" on Serve and Forehand Velocities in Collegiate Tennis Players. *Journal of Strength and Conditioning Research*, *28*(12), 3469–3475. https://doi.org/10.1519/JSC.0000000000000604

O'Driscoll, S. W., Horii, E., Ness, R., Cahalan, T. D., Richards, R. R., & An, K.-N. (1992). The relationship between wrist position, grasp size, and grip strength. *The Journal of Hand Surgery*, *17*(1), 169–177. https://doi.org/10.1016/0363-5023(92)90136-D

Okumura, M., Kijima, A., Kadota, K., Yokoyama, K., Suzuki, H., & Yamamoto, Y. (2012). A Critical Interpersonal Distance Switches between Two Coordination Modes in Kendo Matches. *PLoS ONE*, *7*(12), e51877. https://doi.org/10.1371/journal.pone.0051877

Oudejans, R. R. D. (2008). Reality-based practice under pressure improves handgun shooting performance of police officers. *Ergonomics*, *51*(3), 261–273. https://doi.org/10.1080/00140130701577435

Oudejans, R. R. D., & Pijpers, J. R. (2009). Training with anxiety has a positive effect on expert perceptual–motor performance under pressure. *Quarterly Journal of Experimental Psychology*, *62*(8), 1631–1647. https://doi.org/10.1080/17470210802557702

Paetzold, U. U., & Mason, P. H. (Eds.) (2016). *The Fighting Art of Pencak Silat and its Music: From Southeast Asian Village to Global Movement*. BRILL. https://doi.org/10.1163/9789004308756

Pickering, & Vickers (1999). On the double pendulum model of the golf swing. *Sports Engineering*, *2*(3), 161–172. https://doi.org/10.1046/j.1460-2687.1999.00028.x

Pilgrim, J. L., Gerostamoulos, D., & Drummer, O. H. (2014). "King hit" fatalities in Australia, 2000–2012: The role of alcohol and other drugs. *Drug and Alcohol Dependence*, *135*, 119–132. https://doi.org/10.1016/j.drugalcdep.2013.11.019

Pinder, R. A., Davids, K., Renshaw, I., & Araújo, D. (2011). Representative Learning Design and Functionality of Research and Practice in Sport. *Journal of Sport and Exercise Psychology*, *33*(1), 146–155. https://doi.org/10.1123/jsep.33.1.146

Pryce, J. C. (1980). The wrist position between neutral and ulnar deviation that facilitates the maximum power grip strength. *Journal of Biomechanics*, *13*(6), 505–511. https://doi.org/10.1016/0021-9290(80)90343-7

Putnam, C. A. (1993). Sequential motions of body segments in striking and throwing skills: Descriptions and explanations. *Journal of Biomechanics*, *26*, 125–135. https://doi.org/10.1016/0021-9290(93)90084-R

Renden, P. G., Landman, A., Geerts, S. F., Jansen, S. E. M., Faber, G. S., Savelsbergh, G. J. P., & Oudejans, R. R. D. (2014). Effects of anxiety on the execution of police arrest and self-defense skills. *Anxiety, Stress, & Coping*, *27*(1), 100–112. https://doi.org/10.1080/10615806.2013.810213

Renden, P. G., Landman, A., Savelsbergh, G. J. P., & Oudejans, R. R. D. (2015). Police arrest and self-defence skills: performance under anxiety of officers with and without additional experience in martial arts. *Ergonomics*, *58*(9), 1496–1506. https://doi.org/10.1080/00140139.2015.1013578

Renden, P. G., Savelsbergh, G. J. P., & Oudejans, R. R. D. (2017). Effects of reflex-based self-defence training on police performance in simulated high-pressure arrest situations. *Ergonomics*, *60*(5), 669–679. https://doi.org/10.1080/00140139.2016.1205222

Renshaw, I., Chow, J. Y., Davids, K., & Hammond, J. (2010). A constraints-led perspective to understanding skill acquisition and game play: a basis for integration of motor learning theory and physical education praxis? *Physical Education and Sport Pedagogy*, *15*(2), 117–137. https://doi.org/10.1080/17408980902791586

Roach, N. T., Venkadesan, M., Rainbow, M. J., & Lieberman, D. E. (2013). Elastic energy storage in the shoulder and the evolution of high-speed throwing in Homo. *Nature*, *498*(7455), 483–486. https://doi.org/10.1038/nature12267

Roberts, T. J., & Azizi, E. (2011). Flexible mechanisms: the diverse roles of biological springs in vertebrate movement. *Journal of Experimental Biology*, *214*(3), 353–361. https://doi.org/10.1242/jeb.038588

Robling, A. G., Hinant, F. M., Burr, D. B., & Turner, C. H. (2002). Improved Bone Structure and Strength After Long-Term Mechanical Loading Is Greatest if Loading Is Separated Into Short Bouts. *Journal of Bone and Mineral Research*, *17*(8), 1545–1554. https://doi.org/10.1359/jbmr.2002.17.8.1545

Sakai, K., Kitaguchi, K., & Hikosaka, O. (2003). Chunking during human visuomotor sequence learning. *Experimental Brain Research*, *152*(2), 229–242. https://doi.org/10.1007/s00221-003-1548-8

Sala, G., & Gobet, F. (2017). Does Far Transfer Exist? Negative Evidence From Chess, Music, and Working Memory Training. *Current Directions in Psychological Science*, *26*(6), 515–520. https://doi.org/10.1177/0963721417712760

Saunders, T., Driskell, J. E., Johnston, J. H., & Salas, E. (1996). The effect of stress inoculation training on anxiety and performance. *Journal of Occupational Health Psychology*, *1*(2), 170–186. https://doi.org/10.1037/1076-8998.1.2.170

Schöllhorn, W. I., Rizzi, N., Slapšinskaitė-Dackevičienė, A., & Leite, N. (2022). Always Pay Attention to Which Model of Motor Learning You Are Using. *International Journal of Environmental Research and Public Health*, *19*(2), 711. https://doi.org/10.3390/ijerph19020711

Senn, C. Y., Eliasziw, M., Barata, P. C., Thurston, W. E., Newby-Clark, I. R., Radtke, H. L., & Hobden, K. L. (2015). Efficacy of a Sexual Assault Resistance Program for University Women. *New England Journal of Medicine*, *372*(24), 2326–2335. https://doi.org/10.1056/NEJMsa1411131

Shea, J. B., & Morgan, R. L. (1979). Contextual interference effects on the acquisition, retention, and transfer of a motor skill. *Journal of Experimental Psychology: Human Learning and Memory*, *5*(2), 179–187. https://doi.org/10.1037/0278-7393.5.2.179

Slimani, M., Chaabène, H., Davis, P., Franchini, E., Cheour, F., & Chamari, K. (2017). Performance Aspects and Physiological Responses in Male Amateur Boxing Competitions: A Brief Review. *Journal of Strength and Conditioning Research*, *31*(4), 1132–1141. https://doi.org/10.1519/JSC.0000000000001643

Smith, M. S., Dyson, R. J., Hale, T., & Janaway, L. (2000). Development of a boxing dynamometer and its punch force discrimination efficacy. *Journal of Sports Sciences*, *18*(6), 445–450. https://doi.org/10.1080/02640410050074377

Tang, Y.-Y., Hölzel, B. K., & Posner, M. I. (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience*, *16*(4), 213–225. https://doi.org/10.1038/nrn3916

Tassignon, B., Verschueren, J., Baeyens, J.-P., Benjaminse, A., Gokeler, A., Serrien, B., & Clijsen, R. (2021). An Exploratory Meta-Analytic Review on the Empirical Evidence of Differential Learning as an Enhanced Motor Learning Method. *Frontiers in Psychology*, *12*, 533033. https://doi.org/10.3389/fpsyg.2021.533033

Trulson, M. E. (1986). Martial Arts Training: A Novel "Cure" for Juvenile Delinquency. *Human Relations*, *39*(12), 1131–1140. https://doi.org/10.1177/001872678603901204

Turner, C. H., & Robling, A. G. (2003). Designing Exercise Regimens to Increase Bone Strength. *Exercise and Sport Sciences Reviews*, *31*(1), 45–50. https://doi.org/10.1097/00003677-200301000-00009

Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., ... Meyer, D. E. (2018). Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation. *Perspectives on Psychological Science*, *13*(1), 36–61. https://doi.org/10.1177/1745691617709589

Walilko, T. J., Viano, D. C., & Bir, C. A. (2005). Biomechanics of the head for Olympic boxer punches to the face. *British Journal of Sports Medicine*, *39*(10), 710–719. https://doi.org/10.1136/bjsm.2004.014126

Walker, J. D. (1975). Karate strikes. *American Journal of Physics*, *43*(10), 845–849. https://doi.org/10.1119/1.9966

Warden, S. J., Mantila Roosa, S. M., Kersh, M. E., Hurd, A. L., Fleisig, G. S., Pandy, M. G., & Fuchs, R. K. (2014). Physical activity when young provides lifelong benefits to cortical bone size and strength in men. *Proceedings of the National Academy of Sciences*, *111*(14), 5337–5342. https://doi.org/10.1073/pnas.1321605111

Weiss, N. D., Gordon, L., Bloom, T., So, Y., & Rempel, D. M. (1995). Position of the wrist associated with the lowest carpal-tunnel pressure: implications for splint design. *The Journal of Bone & Joint Surgery*, *77*(11), 1695–1699. https://doi.org/10.2106/00004623-199511000-00008

Welch, A. S., & Tschampl, M. (2012). Something to Shout About: A Simple, Quick Performance Enhancement Technique Improved Strength in Both Experts and Novices. *Journal of Applied Sport Psychology*, *24*(4), 418–428. https://doi.org/10.1080/10413200.2012.688787

Whiting, W. C., Gregor, R. J., & Finerman, G. A. (1988). Kinematic analysis of human upper extremity movements in boxing. *The American Journal of Sports Medicine*, *16*(2), 130–136. https://doi.org/10.1177/036354658801600207

Wilk, S. R., McNair, R. E., & Feld, M. S. (1983). The physics of karate. *American Journal of Physics*, *51*(9), 783–790. https://doi.org/10.1119/1.13498

Wilson, L. (2009). Jurus, Jazz Riffs and the Constitution of a National Martial Art in Indonesia. *Body & Society*, *15*(3), 93–119. https://doi.org/10.1177/1357034X09339103

Worsey, M. T., Espinosa, H. G., Shepherd, J. B., & Thiel, D. V. (2019). Inertial Sensors for Performance Analysis in Combat Sports: A Systematic Review. *Sports*, *7*(1), 28. https://doi.org/10.3390/sports7010028

Wu, H. G., Miyamoto, Y. R., Castro, L. N. G., Ölveczky, B. P., & Smith, M. A. (2014). Temporal structure of motor variability is dynamically regulated and predicts motor learning ability. *Nature Neuroscience*, *17*(2), 312–321. https://doi.org/10.1038/nn.3616

Wulf, G. (2013). Attentional focus and motor learning: a review of 15 years. *International Review of Sport and Exercise Psychology*, *6*(1), 77–104. https://doi.org/10.1080/1750984X.2012.723728

Wymbs, N. F., Bassett, D. S., Mucha, P. J., Porter, M. A., & Grafton, S. T. (2012). Differential Recruitment of the Sensorimotor Putamen and Frontoparietal Cortex during Motor Chunking in Humans. *Neuron*, *74*(5), 936–946. https://doi.org/10.1016/j.neuron.2012.03.038

Zaccaro, A., Piarulli, A., Laurino, M., Garbella, E., Menicucci, D., Neri, B., & Gemignani, A. (2018). How Breath-Control Can Change Your Life: A Systematic Review on Psycho-Physiological Correlates of Slow Breathing. *Frontiers in Human Neuroscience*, *12*, 353. https://doi.org/10.3389/fnhum.2018.00353

About This Book

Title. *Wave and Return: The Bent Fist, the Figure-Eight, and the Science of a Restrained Hand.* Book 2 of the Companions to the System of Inevitability.

Compiled by Cory Matthew Snell. **System originated by** Uki (@ukigigi). First edition, November 2026.

Also in this series. Book 1: *Walking and Turning: Iron, Spirals, and the Science of a Practicing Mind*, on the iron balls, the ring bar, and the brain science of juggling and skill. Book 3: *Shape and Choice: Everyday Geometry, Calm Presence, and the Science of a Choosing Mind*, on the system's everyday geometry, solitary training, calm presence, the originator's own list of dangers, and the science of keeping choice inside automatic skill. Book 4: *Lens and Lattice: Altered Perception, the Internal Arts, and the Science of a Curious Practice*, a harm-reduction companion on practising the internal arts with curiosity in altered states, responsibly, and on the science of psilocybin, perception, touch, pattern finding, and integration. Book 5: *Nucleus and Orbit: Atoms, Necessity, and the Science of an Interwoven Practice*, on the system's atomism, its 3-6-9 architecture, and its quantum language set beside the real science of atoms, necessity, chaos, the fractal body, and interdependence, tying the series together. The series continues.

Independence. This is an independent, unofficial work. It has not been reviewed or endorsed by Uki. Descriptions of the System of Inevitability are based on a consolidation of a May 2026 conversation about the system and on a separate viability assessment (October 2026). All progressions, tests, stop rules, and ethical guidance in this book are the compiler's, drawn from general exercise, motor-learning, and violence-prevention science.

Method. Every peer-reviewed study cited was checked against its Crossref record (authors, year, title, journal, volume, pages, DOI), and the specific findings reported were checked against the published abstracts or full texts. Numbers are reported as the original authors reported them. Where a claim is untested, the text says so. No quotations have been invented. Numerical ratings that appear in the source conversation are reported once, as impressions from an AI conversation, and are not treated as evidence.

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Suggested citation. Snell, C. M. (Comp.). (2026). *Wave and return: The bent fist, the figure-eight, and the science of a restrained hand* (Companions to the System of Inevitability, Book 2; 1st ed.). Free edition, CC BY-NC-SA 4.0.

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