

## KINETIC-CHAIN TRANSFER FROM GENERAL POWER DRILLS TO PUNCH PERFORMANCE IN 11-14-YEAR-OLD FEMALE BOXERS

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### **Abstract**

The article develops a kinetic-chain transfer matrix for improving the connection between general power exercises and punch-specific performance in 11-14-year-old female boxers. The central idea is that speed-strength training becomes effective only when the athlete can move from support, through pelvic and trunk rotation, to arm acceleration and rapid defensive return. The study uses theoretical analysis and pedagogical modeling to organize general drills, bridge drills and boxing-specific drills into one applied sequence. The model emphasizes short high-quality repetitions, age-sensitive progression, technical feedback and transfer checks through the Boxing Force mobile application. The proposed transfer matrix can help coaches avoid a common methodological error: increasing general power indicators without improving the punch action itself.

### **Keywords**

kinetic chain, technical transfer, punch performance, youth boxing, female athletes, speed-strength, bridge drills, Boxing Force.

### **Introduction**

In youth boxing, the development of speed-strength qualities is often planned through general exercises such as jumps, medicine-ball throws, push-ups, short sprints and resistance-band movements. These tools are useful, but their effectiveness depends on whether the athlete can transfer the gained power into the boxing action. For 11-14-year-old female boxers, this transfer is not automatic. The athlete may improve a jump or throw test but still lose balance, rotate too late, drop the guard or return slowly after the punch.

The problem is not the absence of strength work; it is the absence of a clear bridge between general power and boxing-specific technique. A punch is a

sequential action in which force begins from the support, passes through the legs and pelvis, is amplified by trunk rotation and appears in the fist at the correct moment. If one link of the chain is delayed, the final speed and impulse are reduced. Therefore, the coach must teach not only stronger movement, but also better timing between links.

The purpose of this article is to propose a kinetic-chain transfer matrix for the educational-training stage of young female boxers. The novelty lies in the arrangement of exercises not by equipment type, but by their transfer function. General drills prepare the physical base, bridge drills connect power with the boxing pattern and specific drills confirm the transfer in the punch. The Boxing Force mobile application is used as a monitoring tool that records the quality, rhythm and asymmetry of this transfer.

### Methods

The article applies theoretical analysis, practical modeling and methodical classification of speed-strength exercises. The transfer matrix was designed around four links of the kinetic chain: support, rotation, distal acceleration and return. For each link, three levels of exercise were selected: general power, bridge drill and boxing-specific drill. The general level develops a physical ability; the bridge level changes the ability into a boxing-like action; the specific level checks whether the movement improves the punch without destroying technique.

The model follows three pedagogical rules. First, the athlete must master the movement without excessive resistance before the load is increased. Second, the coach evaluates not only the outcome of the punch but also the order of links in the chain. Third, every general drill must be followed by a transfer drill, otherwise the session remains physically useful but technically incomplete. In the mobile application, the coach can record planned drills, actual completion, subjective effort, technical notes and left-right asymmetry.

**Table 1. Kinetic-chain transfer matrix for young female boxers.**

Chain link	General power drill	Bridge drill	Specific boxing check
Support	Low squat jump, split-stance hold	Step-in with elastic band tension	Fast entry into straight punch and balanced guard
Pelvis-trunk rotation	Medicine-ball rotational throw	Half-kneeling band rotation to punch line	Hook or diagonal punch with stable feet
Distal acceleration	Explosive push-up, short band extension	Single punch on visual signal	One-two combination with speed control
Return and protection	Lateral hop and stick landing	Punch and immediate guard recovery	Punch-exit-defence cycle in 8 seconds

The practical training order was developed for a standard session. The warm-up prepares joint mobility and footwork. The first main part uses one or two general drills. The second part uses bridge drills with low or moderate resistance. The third part contains boxing-specific combinations, short station work and transfer checks. The final part includes recovery, technical reflection and digital recording. The entire sequence must stay within the athlete's ability to maintain technique.

## Results

The transfer matrix produced three applied results. The first result is methodological clarity. Instead of placing all speed-strength exercises in one list, the coach can define the exact reason for each exercise: support, rotation, acceleration or return. This makes the session more understandable for both the coach and the athlete. A medicine-ball throw, for example, is no longer an isolated power drill; it becomes preparation for the rotational phase of the punch.

The second result is improved progression. For 11-12-year-old athletes, the model prioritizes support, landing quality, simple visual signals and straight-punch transfer. For 13-14-year-old athletes, the coach can gradually add diagonal trajectories, rotational combinations, two-punch series and resistance vest work. In both age groups, the key criterion is not maximum effort but correct connection between links. If the chain is broken, the load is reduced and the bridge drill is repeated.

**Table 2. Applied transfer sequence within one microcycle.**

Day	Main aim	Transfer content	Digital note in the app
Session 1	Support and entry	Split stance, step-in, straight punch transfer	Balance, entry speed, stance after punch
Session 2	Rotation and punch path	Medicine-ball throw, band rotation, hook trajectory	Left-right asymmetry and trunk timing
Session 3	Acceleration and return	Visual signal punch, 8-second station, guard return	Speed drop, subjective effort, recovery
Optional control	Technical transfer check	Short bag test and coach video note	Whether general power appears in the punch

The third result is the introduction of a transfer check. After each general or bridge drill, the athlete performs a short boxing-specific action. This prevents the training process from becoming separated into physical training on one side and boxing technique on the other. The mobile application supports this process by collecting repeated observations and helping the coach see whether the same technical problem appears across several sessions.

A further practical result is the possibility of diagnosing the exact point at which transfer fails. Some athletes start the punch quickly but lose trunk rotation. Others rotate well but cannot accelerate the arm at the correct moment. A third group produces a strong strike but returns to guard too slowly. The kinetic-chain matrix helps the coach identify the broken link and select a correction drill instead of repeating the entire program without precision.

**Table 3. Correction protocol when the kinetic-chain transfer is disrupted.**

Observed error	Probable broken link	Immediate correction drill	Control task	Coaching focus
Slow entry before punch	Support and first step	Split-stance start and step-in signal drill	Straight punch after one step	Do not lean; push from the floor
Punch begins from the shoulder only	Pelvis-trunk rotation	Medicine-ball rotation and band-to-punch bridge	Hook trajectory with stable feet	Turn pelvis before arm acceleration
Fast punch but guard drops	Return and protection	Punch-return rhythm drill	8-second punch-exit cycle	Finish in defensive stance
Left side weaker than right	Unilateral coordination	Single-side band drill and mirror feedback	Left-right comparison in app	Correct asymmetry before progression
Fatigue breaks technique	Recovery and pacing	Shorter work interval with full reset	Quality repetitions only	Stop before technical collapse

This diagnostic logic is important because young athletes often interpret correction as a sign of weakness. The coach should explain that correction is a normal part of transfer formation. When the athlete understands that the task is to improve one link of the chain, psychological resistance decreases. The mobile application can support this communication by showing that the goal of the week is not more volume, but a better chain: stable support, timely rotation, clean acceleration and quick recovery.

The transfer model can also be adapted for group training. While one subgroup performs general power drills, the second subgroup completes bridge drills, and the third subgroup performs specific boxing checks. After several minutes the subgroups rotate. The coach observes the weakest link of each athlete and enters a short note in the application. This order keeps the session dynamic and makes individualization possible even when the group is large.

For practical use, the transfer matrix should be converted into a simple lesson algorithm. The coach begins with one physical quality, then immediately connects it with a boxing action and finishes with a short control task. This order helps the athlete understand that strength, speed and coordination are not separate goals. They are useful only when they appear in the punch at the right time and disappear quickly enough for defensive recovery.

**Table 4. Lesson algorithm based on kinetic-chain transfer.**

Lesson phase	Duration	Methodical content	Transfer criterion
Preparation	10-12 min	Mobility, stance, footwork and support rhythm	Athlete keeps balance without tension
General power	8-10 min	One jump or medicine-ball exercise	Power is produced from the floor
Bridge drill	10-12 min	Band or signal drill that resembles punch mechanics	Support and rotation appear in correct order
Specific check	8-10 min	Short bag or pad combinations	Punch is fast and return is immediate
Feedback	3-5 min	App note and coach explanation	One correction is selected for next session

The lesson algorithm is useful because it gives the coach a practical boundary. If the specific check fails, the next session should not introduce more complex exercises. It should return to the broken link of the chain. This makes progression slower in appearance but faster in quality, because each new level rests on a stable technical base.

### Discussion

The proposed model is classical in its logic but modern in its monitoring. Classical boxing training has always valued stance, timing, rhythm and punch return. The kinetic-chain transfer matrix translates these principles into a structured speed-strength methodology. It reminds the coach that young athletes should not chase heavy resistance or excessive repetition numbers. They need coordinated force, correct timing and the ability to return to a safe technical position.

For young female boxers, the model also has a safety function. Many power drills create high landing or rotational demands. If the athlete cannot control the knee line, trunk position or shoulder trajectory, the movement may increase risk instead of improving performance. By using bridge drills, the coach can detect weak links early and correct them before adding intensity. This is especially relevant during periods of rapid growth, when coordination and limb proportions change quickly.

The role of the Boxing Force mobile application is not to measure every biomechanical variable with laboratory precision. Its practical value is to create continuity in observation. When the coach records which link of the chain failed, how much asymmetry appeared and how the athlete felt, the next session can be adjusted more intelligently. In this sense, the application becomes a digital memory of the training process.

The model may be applied in ordinary sports schools because it does not require complicated equipment. A medicine ball, elastic bands, boxing gloves, a bag, visual signals and a mobile application are enough to organize the sequence. More advanced tools, such as a six-zone resistance vest or video analysis, can be added later. The main requirement is methodological discipline: every exercise must have a transfer purpose.

The transfer matrix is also useful for planning control tests. A general test, such as a jump or a medicine-ball throw, should be interpreted together with a boxing-specific check. If the general result improves but the punch check remains unchanged, the coach should not immediately increase the load. Instead, the bridge level must be strengthened. This rule protects the program from the common mistake of confusing physical development with boxing performance.

Another practical advantage is economy of time. Youth boxing sessions are usually limited, and the coach cannot add many separate exercises. The matrix helps to combine physical and technical tasks in one sequence. One drill prepares the link, the next drill transfers it, and the final action verifies it. Such ordering makes the session compact, meaningful and easier to explain to young athletes.

### **Conclusion**

The kinetic-chain transfer matrix provides a practical way to connect general power development with punch performance in 11-14-year-old female boxers. The sequence of general drill - bridge drill - specific boxing check helps coaches improve speed-strength without separating it from technique. The model is age-sensitive, safe and applicable in everyday training. The Boxing Force mobile application strengthens the approach by storing feedback and supporting corrective decisions.

For everyday practice, the coach should plan not isolated exercises but transfer chains. When every general drill has a bridge drill and every bridge drill has a boxing check, the training process becomes more purposeful and more economical.

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