

Notes on Striking: 1

Motivations: Project Melee

What is **Melee**? An attempt at self-taught fighting, constrained by minimal human assistance. To utilize new tools, particularly robotics-AI ones, in technique correction and drilling. Human contact as needed only to spar.

Why undergo the hassle, as opposed to joining a gym? It's a difficult challenge, I haven't seen such a mode of combat training before. Thus, it's outside the realm of possibility as of now. Failure probably will happen, but that's irrelevant.

Further, a majority of martial arts coaches know fighting better, but for the art of training and learning, it's not the case. Few examples -

1. Conditioning, in the name of "warming up", before class. It is physiological ineffective, the central nervous system gets exhausted with any sufficiently intense cardio/muscular training. Therefore, diminishing its learning capacity for techniques.¹

2. Sparring: Either infrequent or unnecessarily aggressive (fragile machismo).

Words of Mr.Lee come to mind

If you want to learn to swim, jump into the water. On dry land no frame of mind is ever going to help you.

...

A good fight should be like a small play, but played seriously.

3. Inefficient conditioning. While the pragmatic idea behind doing 100 pushups (and variants like it) for the hobbyist classes, those who want to learn a little fighting and get a workout in, is acknowledged, it's still grossly inept. Moreover, the large number of pushups, performed with poor form, provide no help - additional stress to the joint + no increased hypertrophy/power. Case in point: Floyd Mayweather's poor pushup form.²

4. Learning mode of technique. Futile repetition of (same) drills, an emphasis on the rhetoric of discipline and consistency, a pedagogic approach makes learning slow. Not anything particular to fighting, for example: academia. Effective learning must spend the majority at the edge of challenge, a minority in revising the basics. Thus, one must frustratingly fail for the majority of the session to maximally learn.

These notes and essays are to help document the project.

Point of Contact

Let's divide the units of striking, consider a punch as the demonstrative example. Although the following should mostly translate to kicking, elbow and knees. Units of two kinds - Points of Contact and Rotational Axes.

Points of contacts are straightforward, the first and the rear (lead) leg. The first has no direct involvement in generation force, rather it is focused on dispersing force. A stable base is required for that, stable in that there is a decrease in injury-proneness and increase in effective force dispersion. An improperly made first causes injuries, the inefficient force comes subsequently. Trivially, thumb inside the made first, like Richard Hendricks (Silicon Valley, S6 EP4).

Points of contact are straightforward. There's the first and the rear (lead) leg.

Rear (lead) leg allows the generation of force, mainly by pushing off the ground.

In Filimonov VI, et al. 1985³, researchers compare three levels of boxers:

Masters (or Candidate for) of sports, Class I, Class II and III, in descending order of skill. As the skill level increases, the force distribution of the punch from the rear leg, that is pushing off it, increases. An unsurprising conclusion, as a trivial application of Newtonian Mechanics (third law) helps make this connection.

Rotational Axes

Rotational Axes the particular rotational points, joints and the like, that allows for rotational acceleration, increasing force. For the straight cross, four rotational axes are utilized

1. Rotation from the balls of the feet, thus the rotation of the entire leg until the hip
2. Trunk/hip rotation
3. Shoulder rotation
4. Slight elbow rotation

In Hintz, T. (2023)⁴, hip rotation is emphasized as the factor of difference between low level boxers and high level ones, for the force of the punch. It seems like hip rotation, and shoulder rotation, has to be technically taught. Perhaps as arm extension comes naturally to untrained/amateur individuals.

While Filimonov, VI. (1985) shows a reduction in force production from trunk rotation as the skill increases, it doesn't mean the irrelevance of hip (trunk) rotation. It measures the relativistic percentage of force production, from the various units defined, rather than the absolute force production. As skill increases, the absolute force production increases too, but relativistically there is an approximate equalization of it among hip rotation and pushing off from the foot.

Potential of the Corkscrew

The Corkscrew: to the current 4 axes (foot, hip, shoulder, slight elbow), another rotational axis is added, the wrist. Although I can't find any empirical studies for its efficacy, theoretically it should help with increased force. For one, the slight rotation of the wrist, and the increased rotation of the elbow, helps increase force production. Also, the cue of twisting the wrist may help certain trainees focus better on rotating the other axes.

References

1. Refer to CNS (Central Nervous System) Fatigue
2. Exercise Scientist Critiques Floyd Mayweather's Training, Renaissance Periodization
https://www.youtube.com/watch?v=5I5_8l_mSBs
3. Filimonov, V. I.; Koptsev, K. N.; Husyanov, Z. M.; Nazarov, S. S.. Boxing: Means of increasing strength of the punch. National Strength and Conditioning Association Journal 7(6):p 65-66, December 1985.
4. Hintz, T. (2023, February 7). *University of Notre Dame*. Biomechanics in the Wild.
<https://sites.nd.edu/biomechanics-in-the-wild/2021/04/06/punch-like-a-nerd-utilizing-biomechanics-in-boxing-form/>