

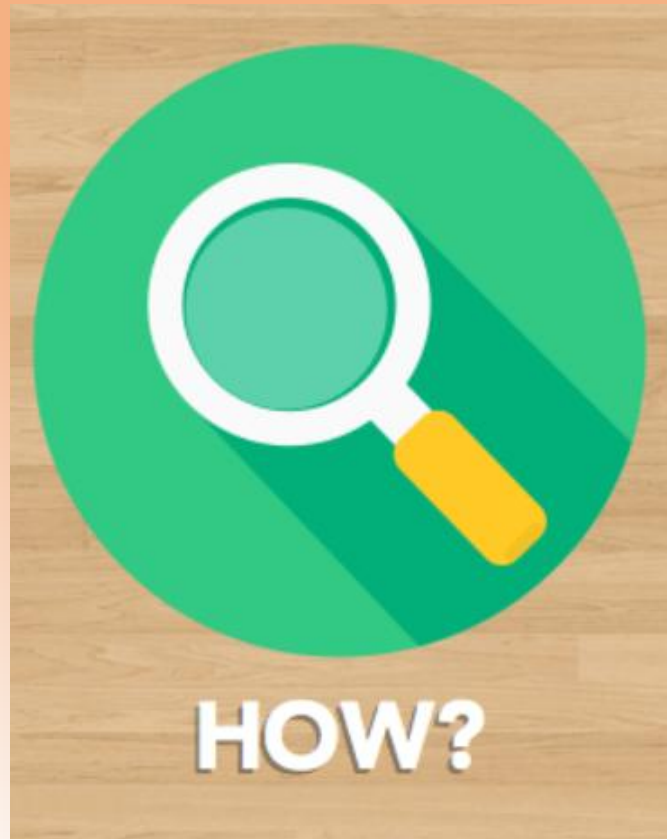


Strength and Conditioning for boxing Pt1

Santiago Nieva – High Performance Director BFI & Dan Jefferson- Strength and Conditioning coach



**The Purpose of S&C
in Boxing**



**The Process behind
the why**

**What will
we cover?**

Philosophy

- ❖ **Adaptation driven**
- ❖ **Consistency is key**
- ❖ **Technical training and strength and conditioning should be a cohesive unit**
- ❖ **Keep it simple, master the basics**

THE PURPOSE OF S&C IN BOXING?

Develop key bio-motor qualities to support the technical execution of a boxer competing at the highest level

An example of repeated

Contribute to ensuring the boxer is physically able to maximise their time training and competition time

Contribute towards developing the boxer to possess the ability to repeatedly produce high intense, explosive actions during training and more importantly competition

Develop the boxers energy systems to be able to recover between rounds, bouts, and regular training

Contribute towards the reduction in injury occurrence

3-STEP PHASE APPROACH

Energetics

Force
Generation

Force
Transmission

FITNESS

STRENGTH

**JOINT STABILITY
& MOBILITY**

BOXER PROFILE – WHAT DOES THE LITERATURE TELL US?

MALES			
Athlete Characteristic	Physical Attribute	Test	Result
Junior-Elite	Body Composition	Skinfolds	9-16%
Junior-Elite	Energetics	Vo2 Max- Treadmill	49-64 (ml/kg/min)
Elite	Strength	Punching Force- Wall mounted force plate	1,368.33 (n)
Light weight	Strength	Grip Strength	R-36.5 L- 34.3
Middleweight	Strength	Grip Strength	R-48.1 L-46.4
Heavyweight	Strength	Grip Strength	R-53.5 L- 50.7
Elite	Power	Countermovement jump	37.42 (cm)
Elite	Power	Squat Jump	36.78 (cm)

FEMALES			
Athlete Characteristic	Physical Attribute	Test	Result
Junior-Elite	Body Composition	Skinfolds	15-26%
Junior-Elite	Energetics	Vo2 Max- Treadmill	48.5-52.1 (ml/kg/min)
Elite	Strength	Punching Force- Wall mounted force plate (Self selected cross)	987.5 (n)
Elite	Power	Squat jump	26.24 (cm)
Elite	Power	Countermovement Jump	27.07 (cm)

“Not all data is published and therefore it is important to note that boxing coaches and sport science have unpublished data which can provide very useful insight”

PERFORMANCE PROFILE – WHAT DOES THE LITERATURE TELL US?

Energy requirements

Lactate Values



PERFORMANCE PROFILE CONT...

○ *Activity Profile*

Novice- 9:1 Work to rest ratio

Elite- 18:1 Work to rest ratio

High intensity and explosive accelerations and decelerations



○ *Lower and upper body strength and power have an impact on punching forces*

○ **Strong relationships with punching forces and lower and upper body strength and power tests**

○ **Punches are delivered at speeds of around 200ms or sometimes less**

○ **Boxers are required to generate force through the hip, knee, and ankle extension, rotation of the trunk, and extension of arm**

ENERGETICS

This can be achieved through various methods

Training phase	Example session	Frequency	Intended physiological adaptations
Oxygen extraction and utilization	30-s all-out maximum effort sprints, 3 min 30 s passive recovery, 4–6 repetitions	2–4 sessions per training wk	Increase maximal activity and content of oxidative and nonoxidative enzymes
			Provide stimuli for improvements in rate of force development
Oxygen delivery	4–8 min at 85–90% maximum heart rate, 2–4 min passive recovery, 4–6 repetitions	2–4 sessions per training wk from 9–6 weeks	Improve cardiovascular capacity (stroke volume, cardiac output, muscle capillarization, and systemic vascular resistance), delivery of O ₂ , and enhance venous return
		1–2 sessions per wk from 6–3 weeks	
Taper	20 s all-out maximum effort, 10 s passive recovery, 4–8 repetitions, 1–2 sets, 5 min recovery between sets	1–2 sessions per wk	Transfer adaptations induced from previous training blocks to boxing-specific activity profiles (fight/tactical dependent) while maintaining cardiovascular and neuromuscular strain
	Reduce training volume exponentially while maintaining high external intensity		

Key Outcomes

Contribute towards developing the boxer to possess the ability to repeatedly produce high intense, explosive actions during training and more importantly competition

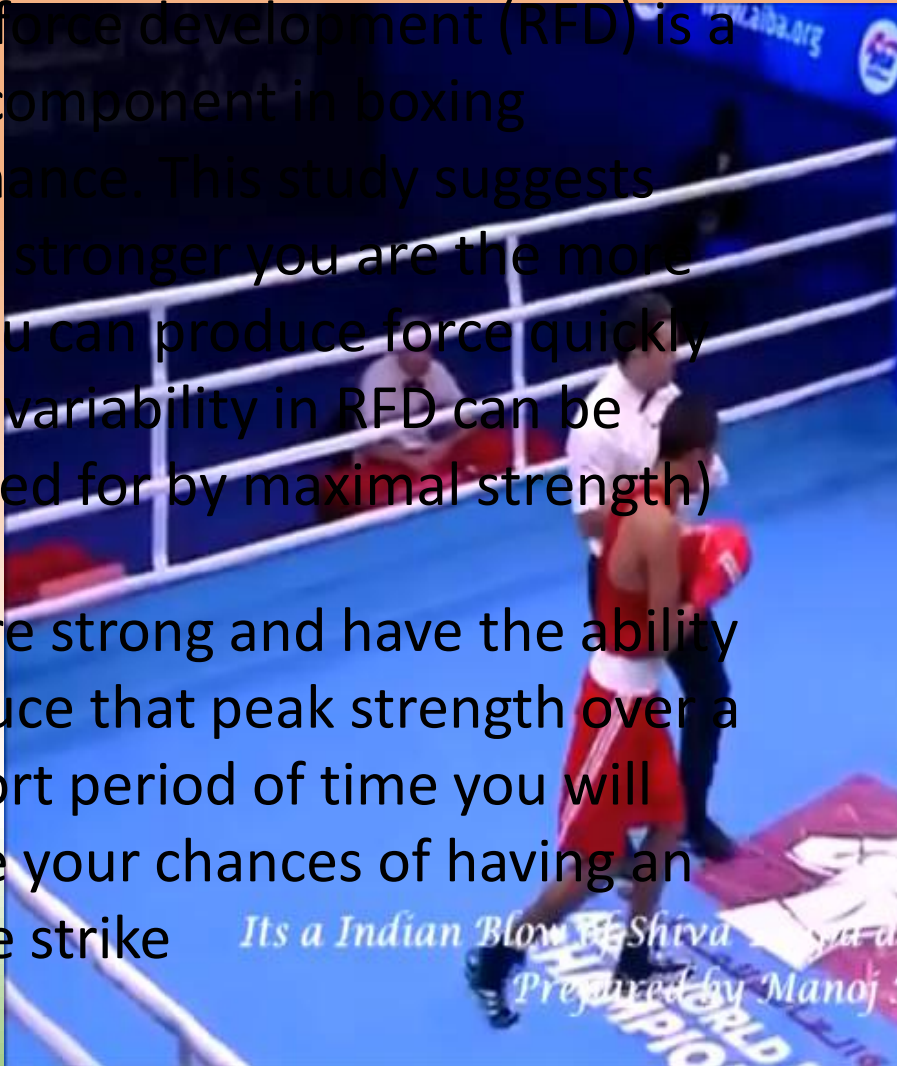
Develop the boxers energy systems to be able to recover between rounds, bouts, and regular training

High intensity interval lactate threshold work can be done in the boxing session and should be periodized

(Ruddock et al., 2016)

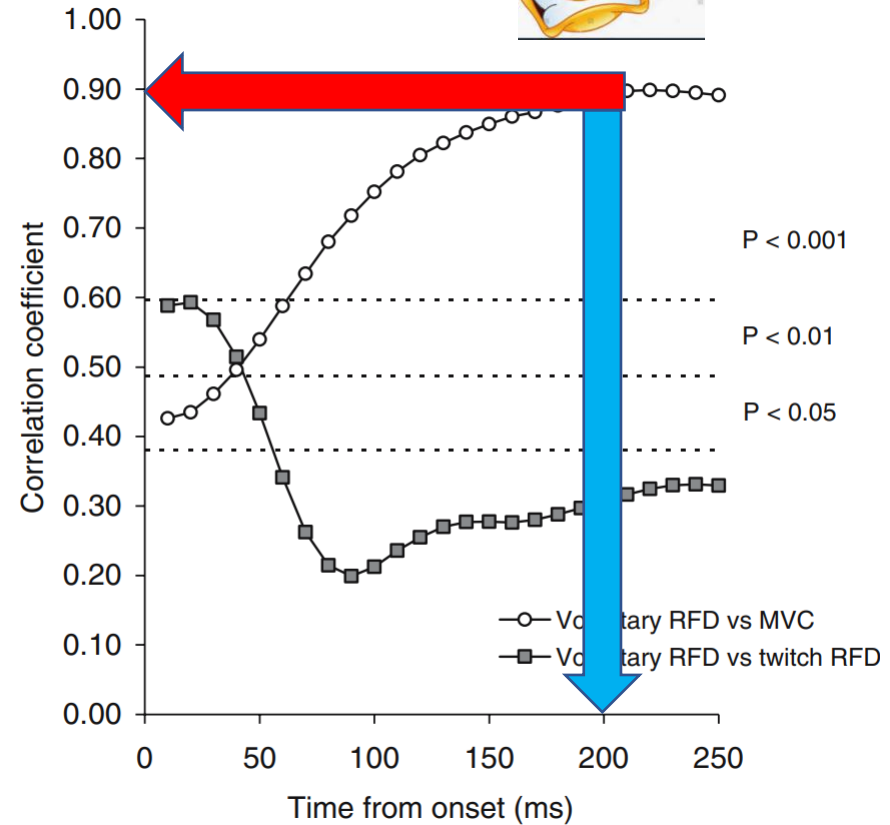
FORCE GENERATION

- Rate of force development (RFD) is a critical component in boxing performance. This study suggests that the stronger you are the more likely you can produce force quickly (90% of variability in RFD can be accounted for by maximal strength)
- If you are strong and have the ability to produce that peak strength over a very short period of time you will increase your chances of having an effective strike



*Its a Indian Blow by Shiva at World Championship.
Prepared by Manoj Kumar...*

Punch occurs in 200ms or less



FORCE GENERATION CONT...

Impulse-Momentum theory

Force x time

This means producing force very quickly

This can be improved by increasing Hand speed, strength, skill

Mass x Velocity

This means moving mass very quickly

This can be improved by increasing mass

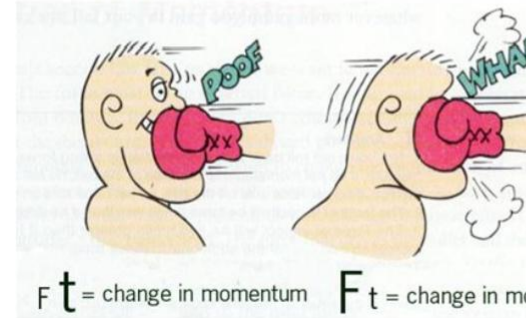
This is a challenge in boxing due to the weight classification!! How to solve?

Impulse - Momentum Theorem

$$Ft = m\Delta v$$

IMPULSE

CHANGE IN MOMENTUM



This theorem reveals some interesting relationships such as the INVERSE relationship between FORCE and TIME

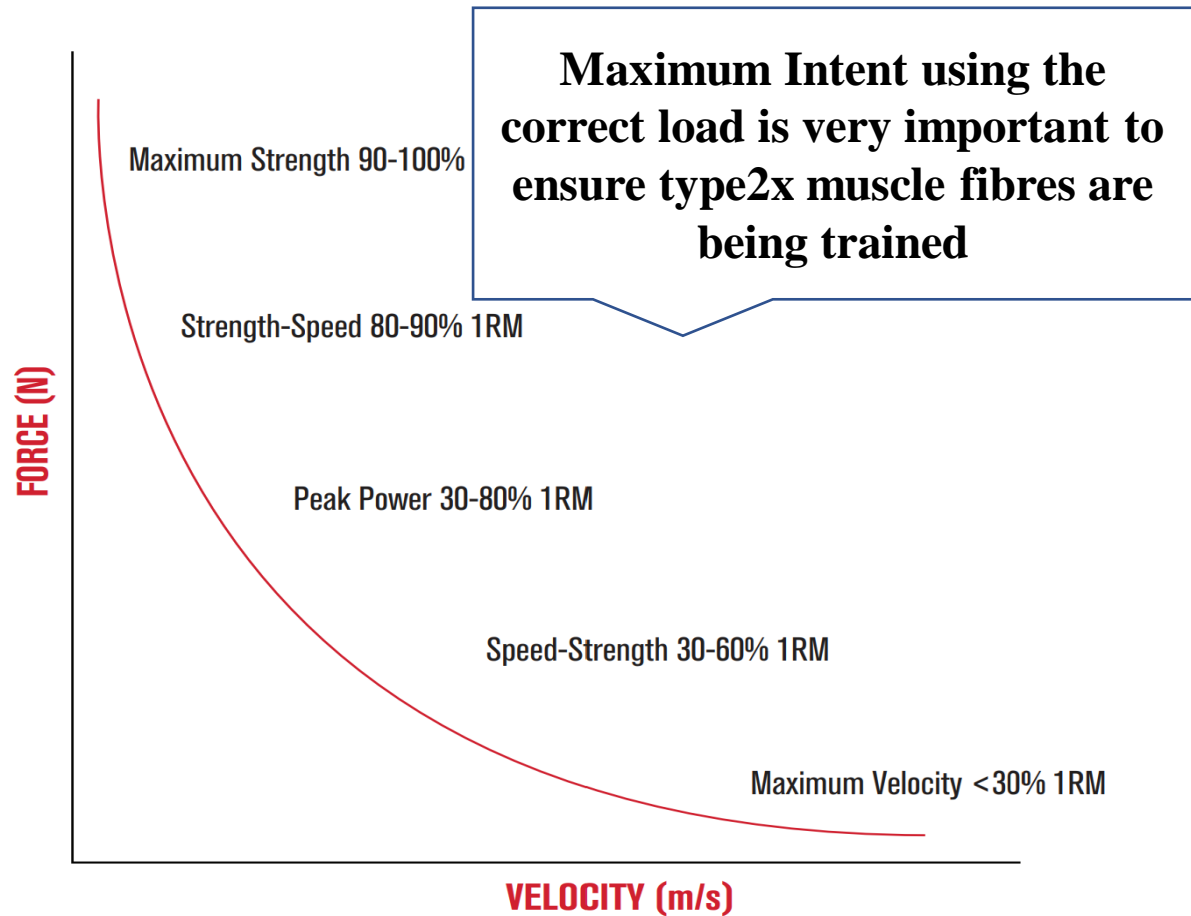
$$F = \frac{m\Delta v}{t}$$

“Transfer of the fundamental strength qualities into a sport-specific physical performance is critical in the ‘realisation’ of the training process”

FORCE GENERATION CONT...

Methodologies to improve this?

THE FORCE-VELOCITY CURVE



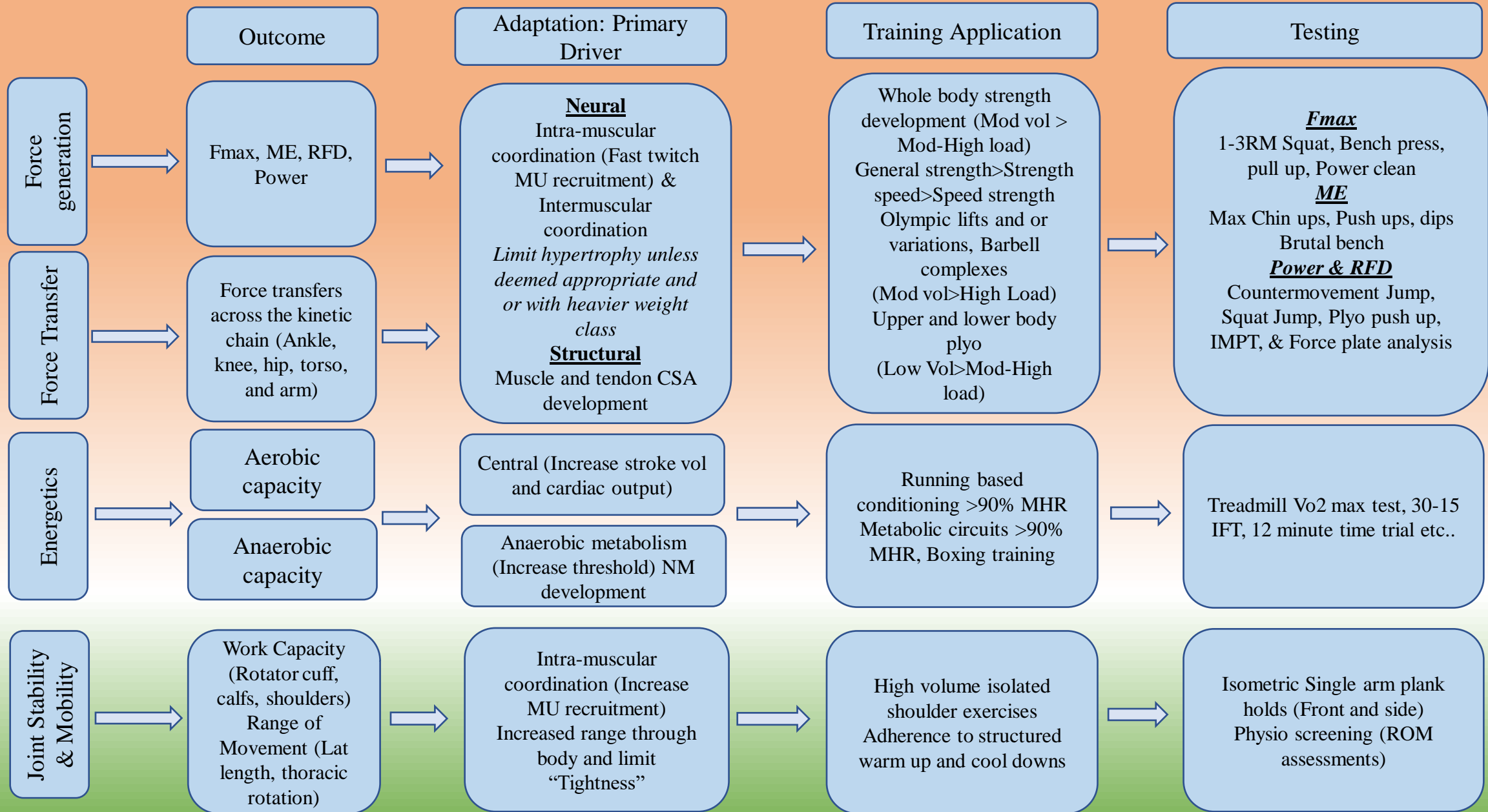
- **Maximal Strength Training**
 - Progressing from high Vol-Low load to Low Vol-high load over a progressive amount of time. This will create a solid foundation. (Examples later in slides)
- **Explosive Strength (Strength-speed & Speed Strength)**
 - Using advanced techniques such as accommodating resistance, barbell complexes, Olympic lifting, landmine variations, medicine ball variations
- **Upper and lower body plyometrics**
 - Variations of jumps
 - Upper body plyo push ups, medicine ball throws, Landmine variations

FORCE TRANSMISSION



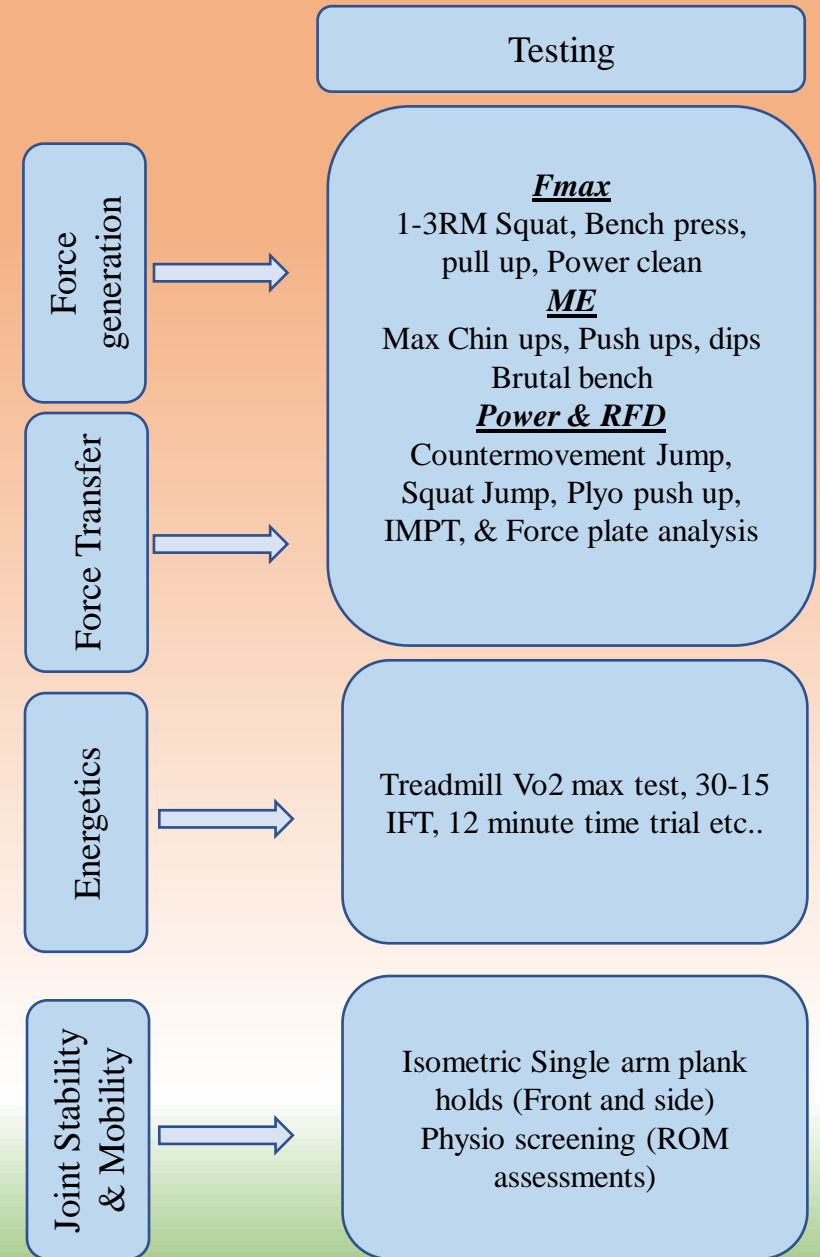
- Force is produced through the kinetic chain from “Foot to Fist” sequentially through ankle, knee, hip, torso and arm. Hip and torso rotation are key
- Trunk (Core) area is a key area to focus on in boxing as this is where forces can be lost during transmission if weak and or restricted with tightness
- Mobility and joint stability is key to optimise performance and allow for force to transfer through the body. Also from an injury perspective, looking after these things are important
- Force expression can be trained during sport specific actions across speed-strength tapering phases (i.e., medicine ball variations, landmine variations)

WHAT ARE THE KPI'S?



TESTING

- Testing can be assessed at a specific time points during the training plan or within training blocks or both
- Putting the boxers through a comprehensive testing battery will allow the coaches to get an understanding of the strengths and weaknesses and therefore direction on future programming
- As described in the KPI model the tests have to relate to the sport and the requirements of the athlete
- Monitoring strategies can be used to ensure the programme is going to plan and if need be, training can be adjusted. Taking an adaptable approach is key to ensuring the athlete is staying on track

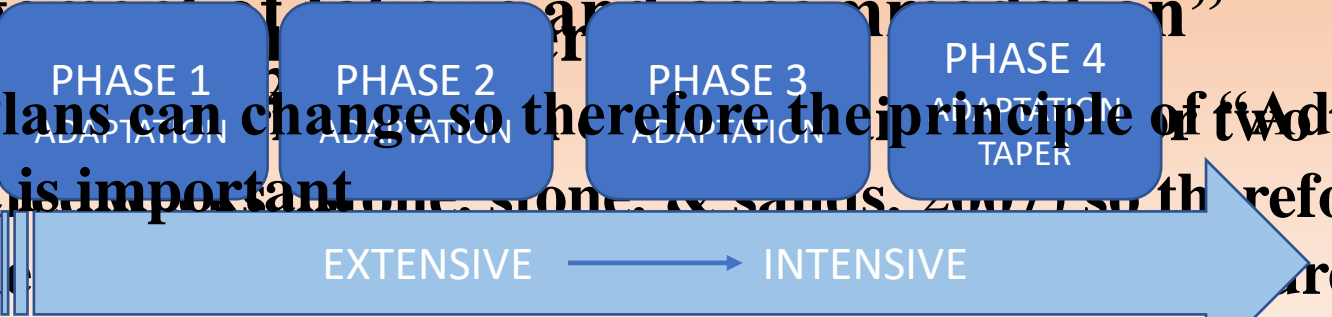


PERIODISATION FOR BOXING

DEFINITION Key points regarding periodisation

➤ In the beginning keep it simple! Do not overcomplicate
“Periodisation may be defined as a training plan whereby peak performance is brought about through potentiation of biomotors and the situation (i.e., sports calendar, age and stage etc..)
managing the periodisation of an athlete’s preparation”

Key (Turner)



WORLD CHAMPIONSHIPS

➤ Plans can change so therefore the principle of “Adaptability” is important
the athlete peaks at the time of major tournaments
➤ the athlete peaks at the time of major tournaments
of high importance that matter

KEY TAKE HOME MESSAGES

- **‘Realisation’ of the strength and power qualities that have been developed, then utilised in a sport-specific physical performance (Competition) is key**
- **Strength and conditioning is there to support and enhance the boxers overall development, allowing them to physically excel in their sport**
- **Working as an integrated team with all the disciplines (Boxing coaches, physio, S&C, Doctors etc...) will allow for a seamless holistic programme to be placed around the athlete**

