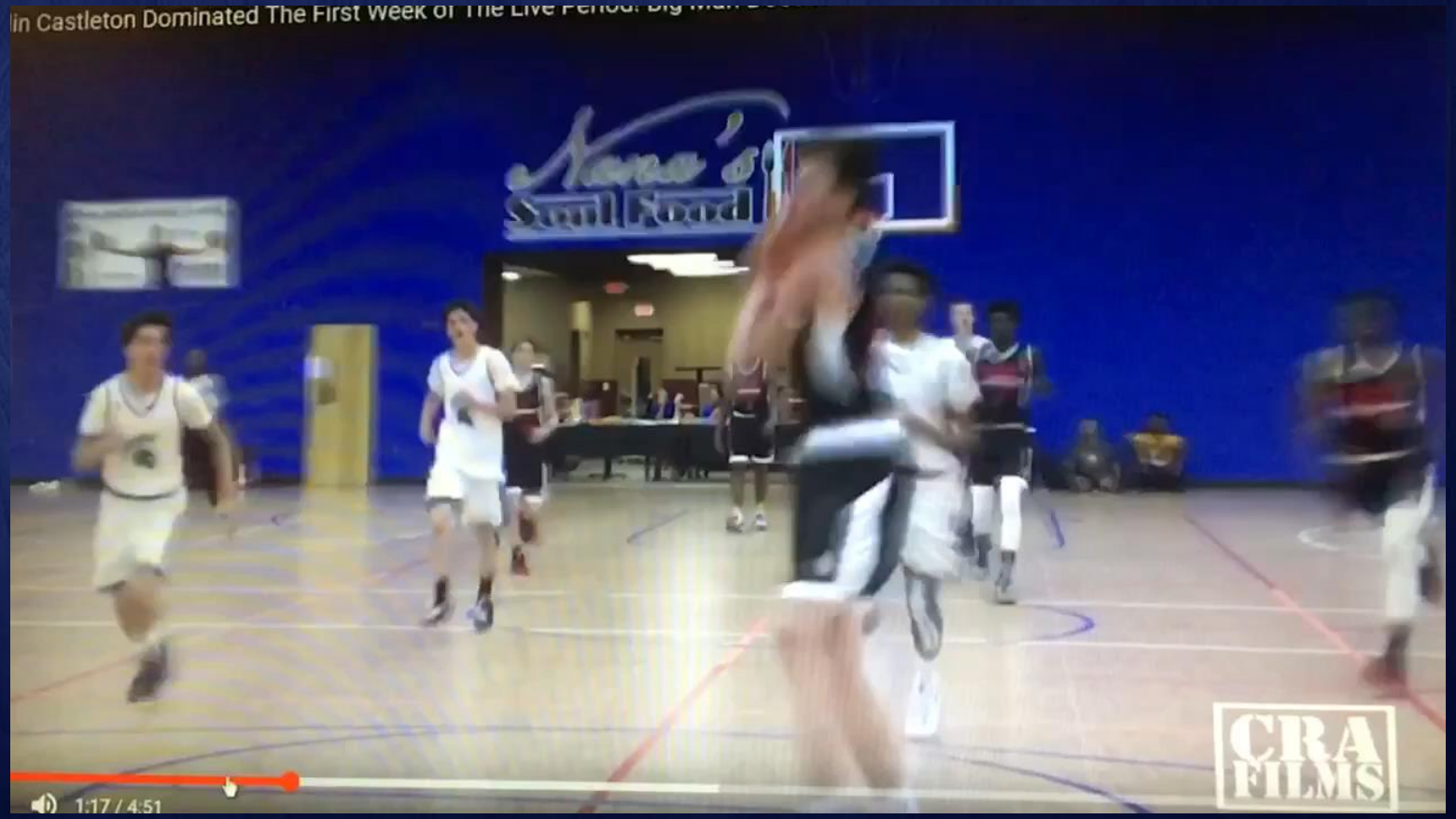
MICHIGAN BASKETBALL

Strength & Conditioning

Jon Sanderson

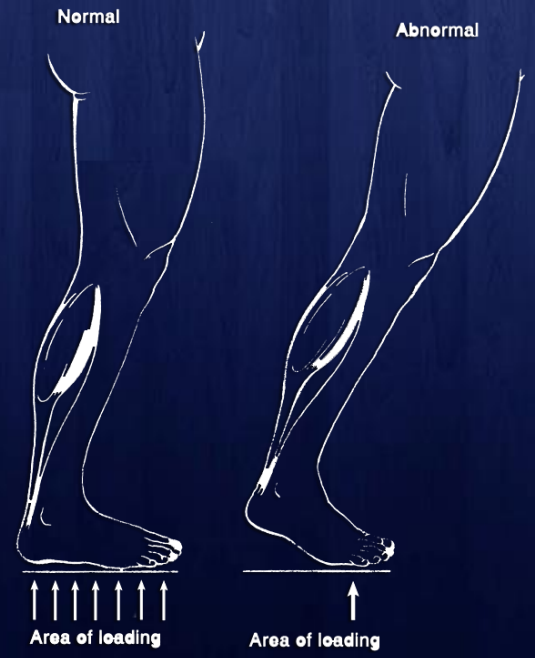
WATCH YOUR ATHLETES PLAY

- How athletic are they?
- How well do they move laterally?
- Do they jump better off 1 leg or 2?
- How tough are they?
- Are they contact seekers or avoiders?
- Do they pursue rebounds or do they ball stare?
- Do they land with balance and pivot well?



HOW DO YOUR ATHLETES LOAD ?

- **Inefficient loading mechanics and anterior translation of center of gravity (forward in loading) will result in less force application and diminished performance**



Efficient loading prior to jump hook

Inefficient loading prior to jump hook

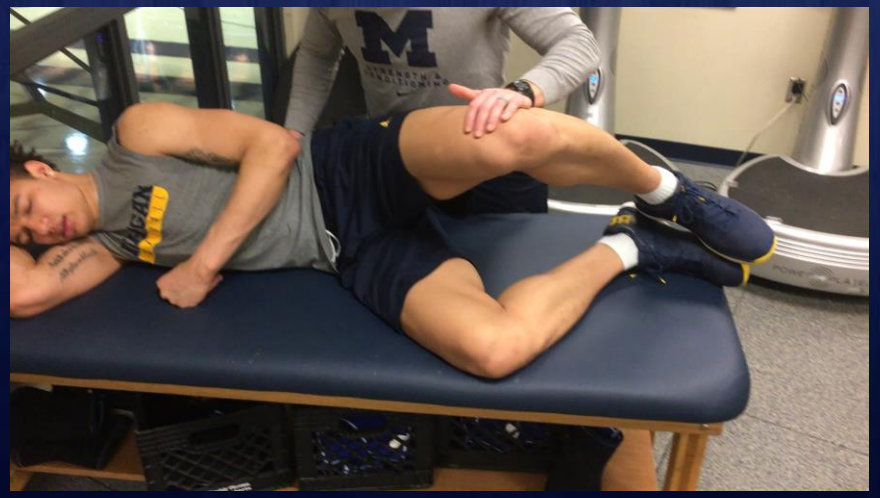
HOW DO YOUR ATHLETES LAND ?

- **Inefficient landing mechanics will result in more stress on the knees.**
- **The hips are the strongest part of our body and are equipped to decelerate forces generated through landing.**

Efficient landing mechanics

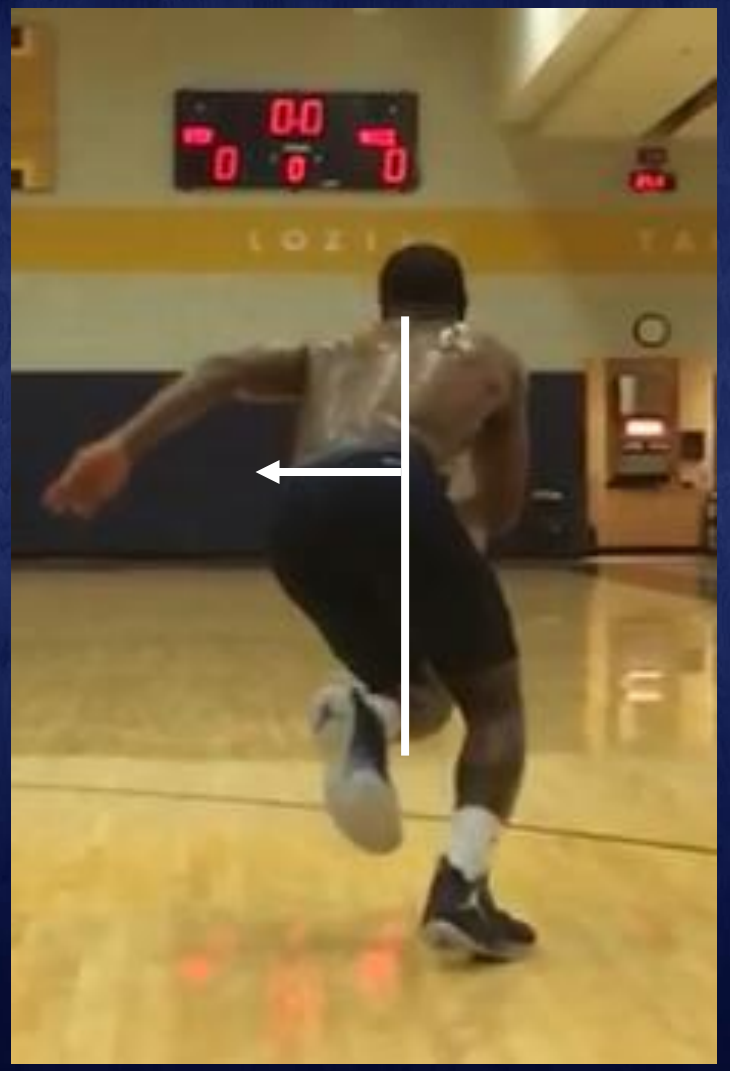
Inefficient landing mechanics

ARE YOUR ATHLETES VALGUS ?

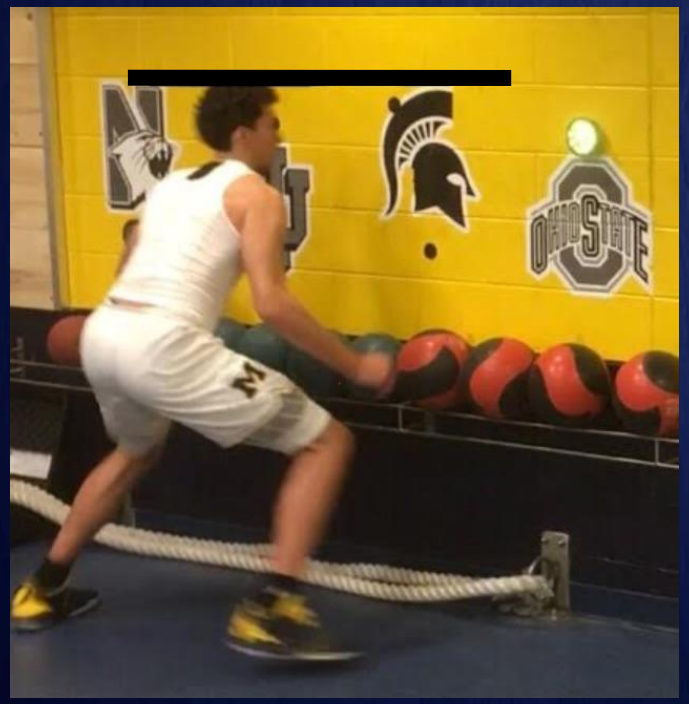


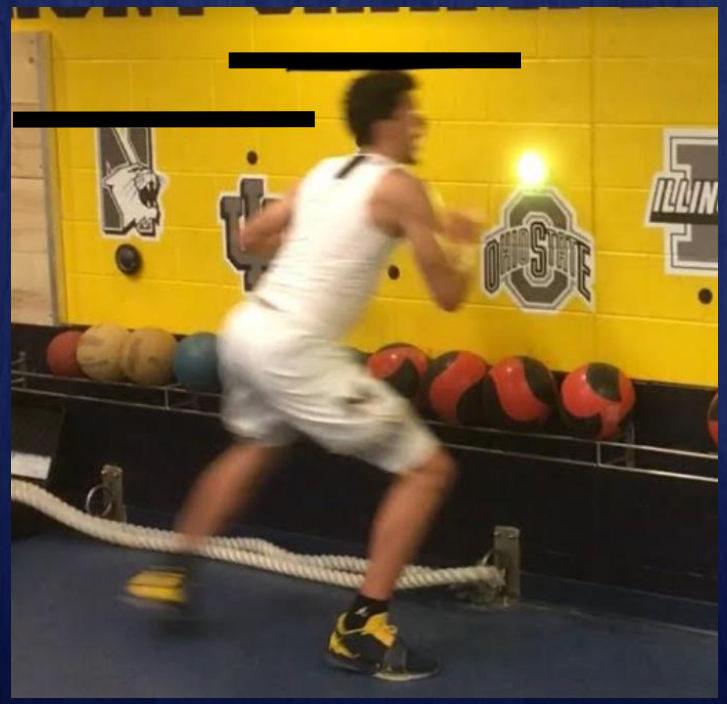
HOW DO YOUR ATHLETES RUN ?

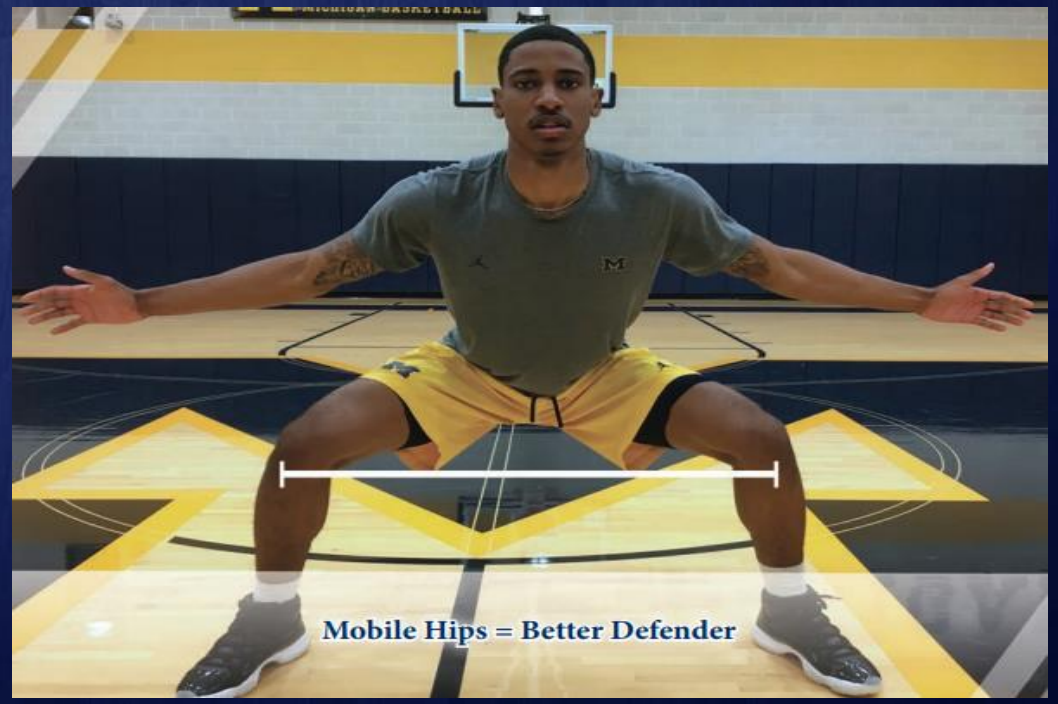
- **Excessive movement in the transverse plane is inefficient**
- **Tight hips will lead to compensation patterns like this**



HOW DO YOUR ATHLETES MOVE LATERALLY ?





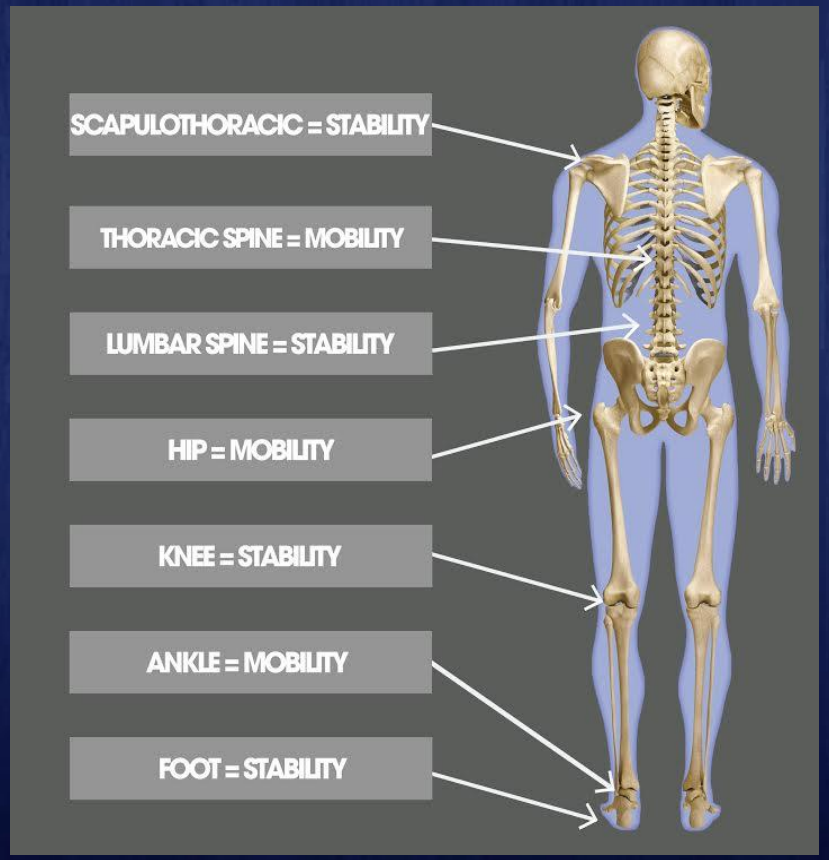


ARE YOUR ATHLETES CONTACT SEEKERS OR AVOIDERS ?

HOW AGGRESSIVE ARE YOUR ATHLETES AT PURSUING REBOUNDS ?

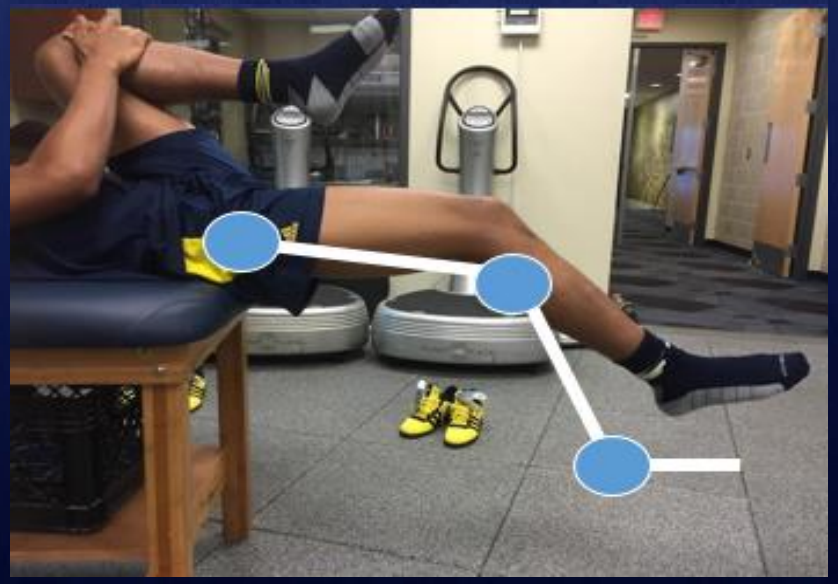
MOVEMENT SCREENING PRIORITIES

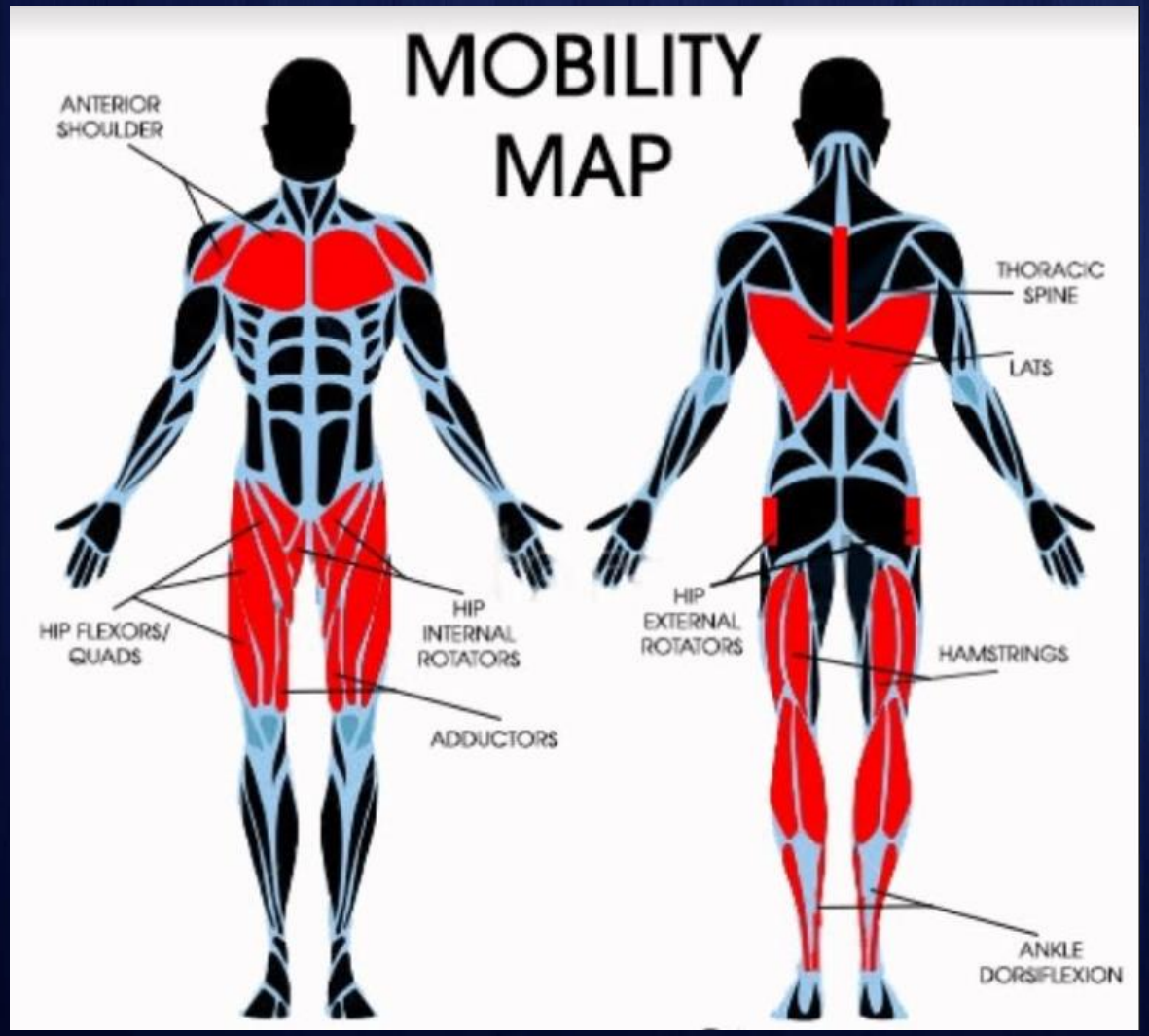
- Ankle
- Hip
- Thoracic Spine
- Anterior Shoulder/ Glenohumeral Joint
- Posture
- Loading/Landing Strategies

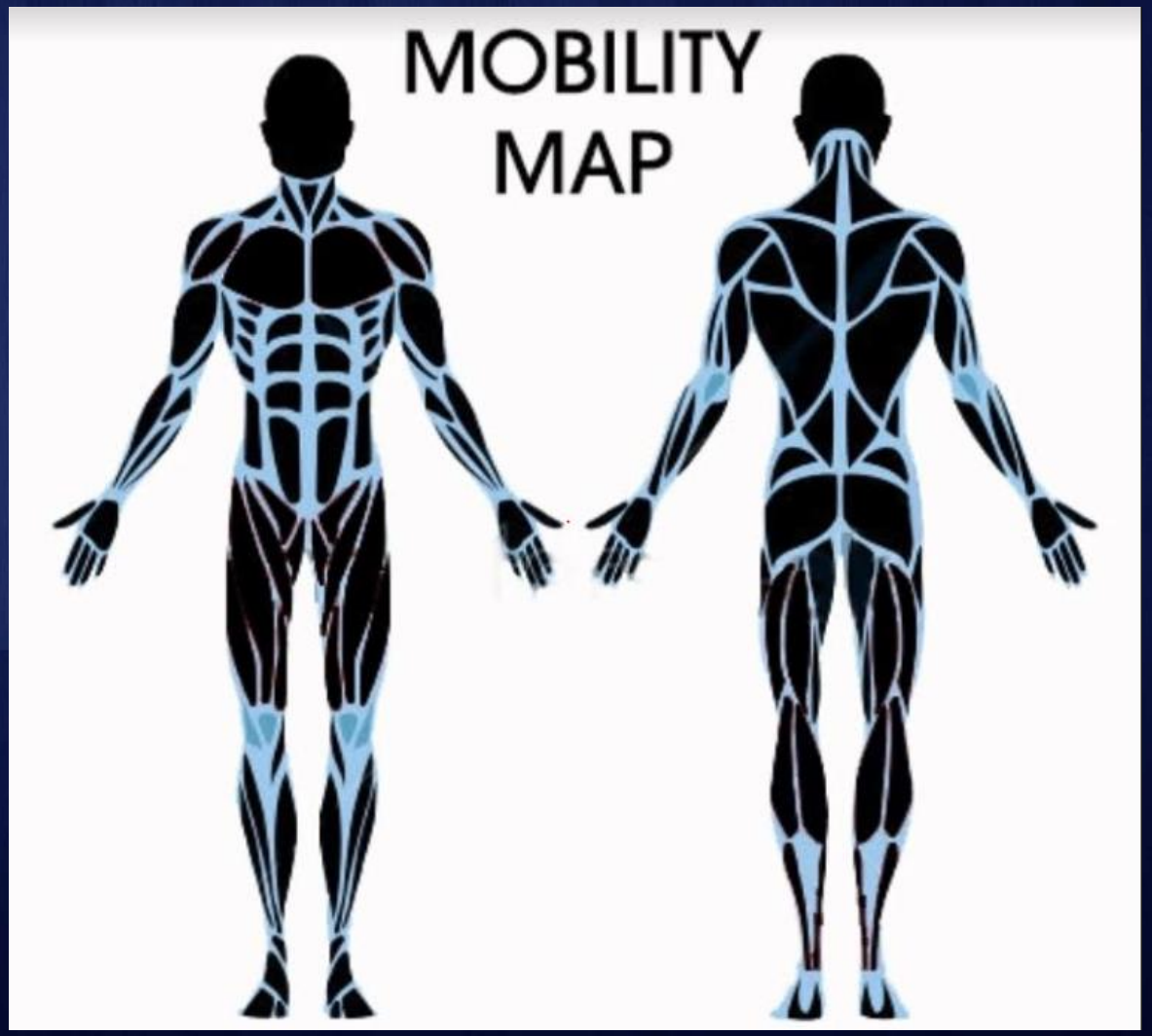


MOVEMENT SCREENING

- Ankle Dorsiflexion Test
- Overhead Squat Assessment
- Single Leg Squat/Landing Assessment
- Thomas Test
- 3-D Hip Mobility
- Thoracic Spine Rotation
- 90-90 Shoulder Test
- Reach/Roll/Lift Test
- Postural Assessment




MOBILITY
MAP
ANTERIOR
SHOULDER
HIP FLEXORS/
QUADS
HIP
INTERNAL
ROTATORS
ADDUCTORS
THORACIC
SPINE
LATS
HIP
EXTERNAL
ROTATORS
HAMSTRINGS
ANKLE
DORSIFLEXION


MOBILITY
MAP

MOBILITY SPECTRUM

MEN'S BASKETBALL

HYPER MOBILE

IMMOBILE

PLAYER 1

PLAYER 2

PLAYER 3

PLAYER 4

PLAYER 5

PLAYER 6

PLAYER 7

PLAYER 8

PLAYER 9

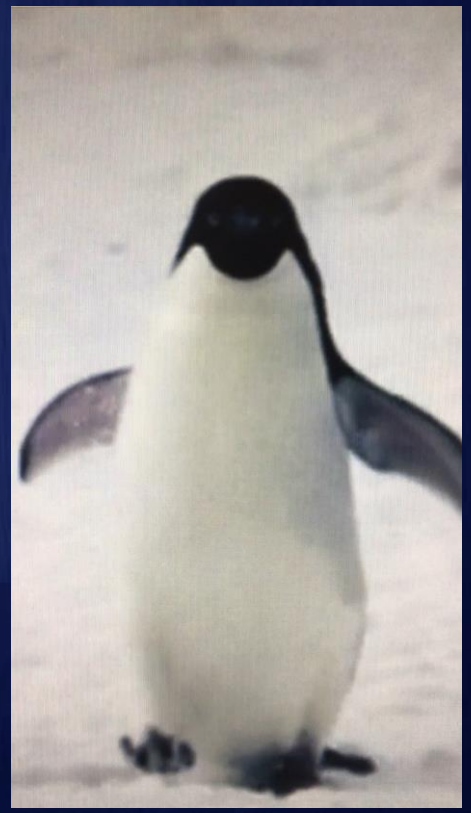
PLAYER 10

PLAYER 11

PLAYER 12

NEEDS EXTRA STABILITY

NEEDS EXTRA MOBILITY



PERFORMANCE TESTING-NBA COMBINE

- Standing vertical jump
- Max vertical jump
- ¾ court jump
- Lane agility
- 185 Bench press test

PERFORMANCE TESTING-WEIGHT ROOM

- Power Clean
- Back Squat
- Bench Press
- Chin-ups (3 sec. Cadence)

PERFORMANCE TESTING-WR CONT.

2017 NBA Slam Dunk Champion Glenn Robinson III squatting 415lbs.

CONDITIONING ASSESSMENT

Gauntlet

- 17 lengths sideline to sideline
- 1 min rest
- 17 lengths sideline to sideline
- 1 min rest
- 8 lengths sideline to sideline

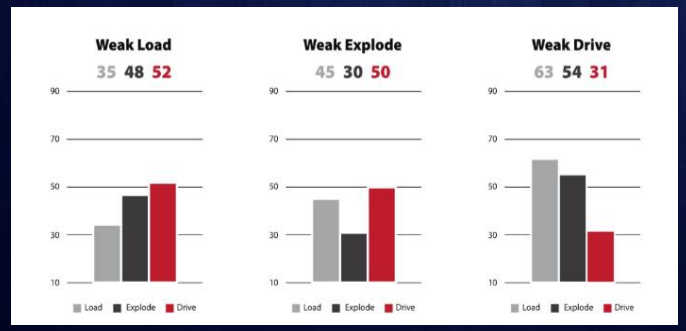
CONDITIONING ASSESSMENT

Celtics Conditioning Test

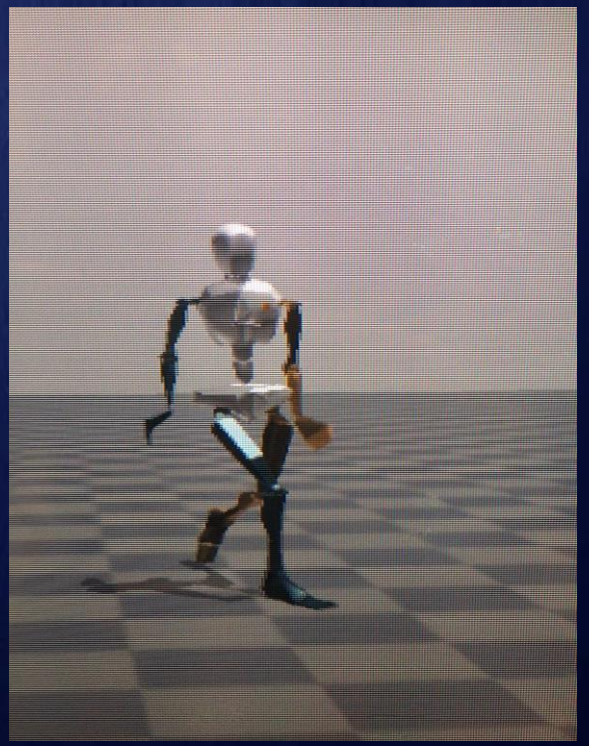
- 3 min. continuous run from baseline to baseline
- Record maximum lengths achieved
- Give ¼ credit if they finish at the free throw line
- Give ½ credit if they finish at half court
- Give ¾ credit if they finish at the opposite free throw line

ADVANCED TECHNOLOGY

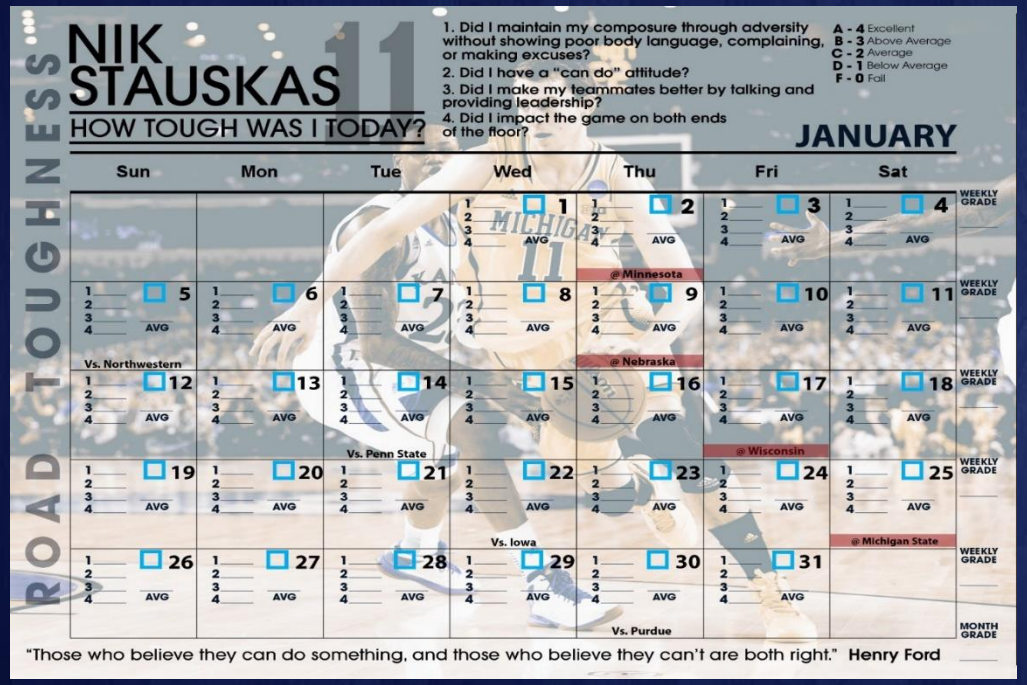
FORCE PLATE TESTING

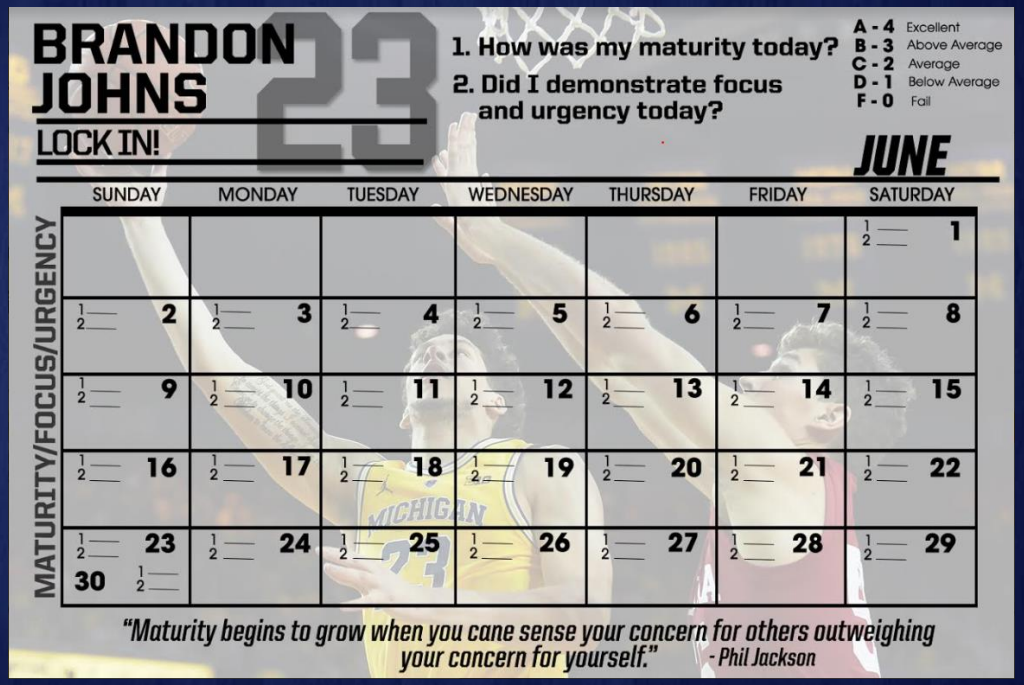


MOTION CAPTURE ANALYSIS

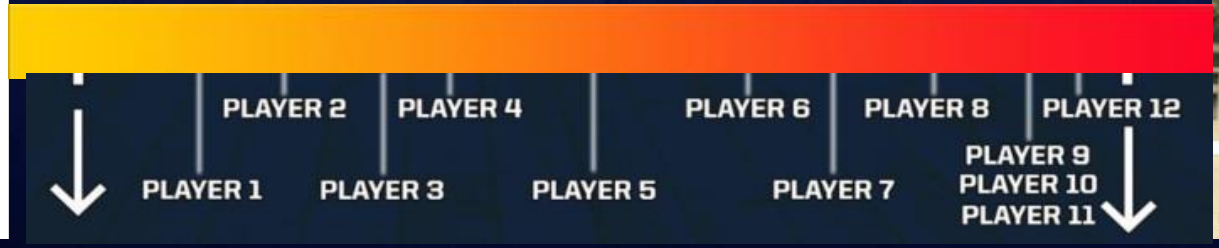


MENTAL/MOTIVATIONAL APPROACH





MOTIVATION SPECTRUM



CREATING A PROFILE

ATHLETE PROFILE SHEET

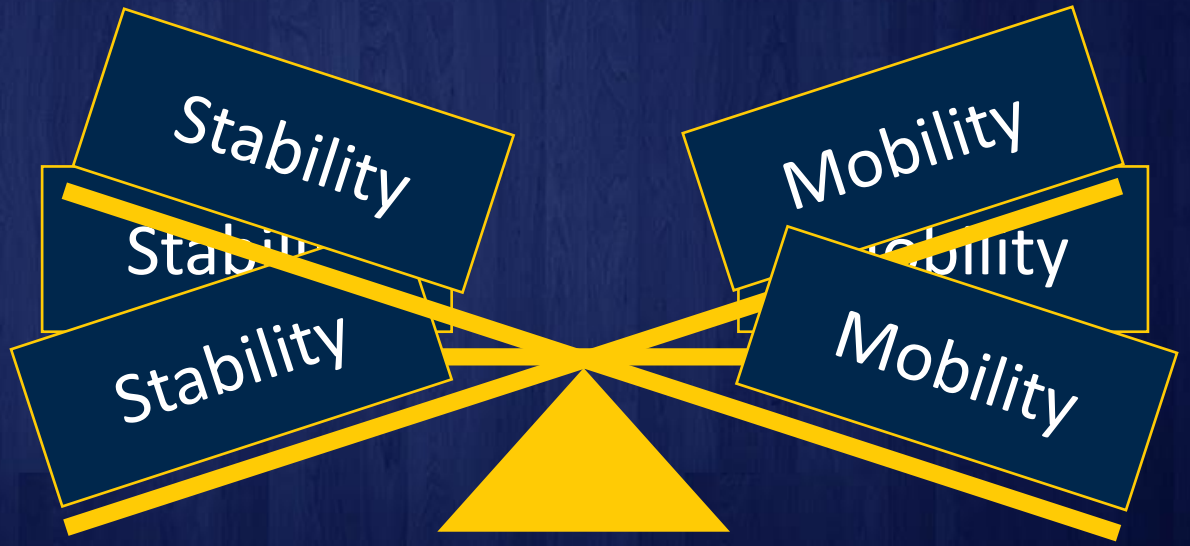
PERFORMANCE TESTING		MOVEMENT SCREEN	
Vertical Jump:	32 in.	Ankle	Excellent
Lane Agility:	10.97 sec.	Hip	Excellent
3/4 Court Sprint:	3.48 sec.	T-Spine	Excellent
Power Clean:	135 lbs.	Anterior Shoulder	Excellent
Back Squat:	185 lbs.	Landing Mechanics	Cleared
Bench Press:	165 lbs.	Knee Valgus Screen	Cleared
Chin-Ups:	9	Postural Screen	Cleared

NOTES:

- Athlete needs to gain 10-15 lbs. of lean muscle mass
- Severe deficits in total body strength
- Average in Speed/Agility/Jumping
- Excellent total body joint mobility
- Needs to develop overall toughness

NIK STAUSKAS

6'6" | 192 | FRESHMAN GUARD



PROFILE OF A HYPERMOBILE ATHLETE

BASELINE PROFILE: D.J. WILSON

PERFORMANCE TESTING		MOVEMENT SCREEN	
VERTICAL JUMP:	29.5 IN.	ANKLE	EXCELLENT
LANE AGILITY:	11.41 SEC.	HIP	EXCELLENT
3/4 COURT SPRINT:	3.42 SEC.	T-SPINE	AVERAGE
POWER CLEAN:	145 LBS.	ANTERIOR SHOULDER	EXCELLENT
BACK SQUAT:	245 LBS.	LANDING MECHANICS	CLEARED
BENCH PRESS:	150 LBS.	KNEE VALGUS SCREEN	FAILED
CHIN-UPS:	1	POSTURAL SCREEN	CLEARED

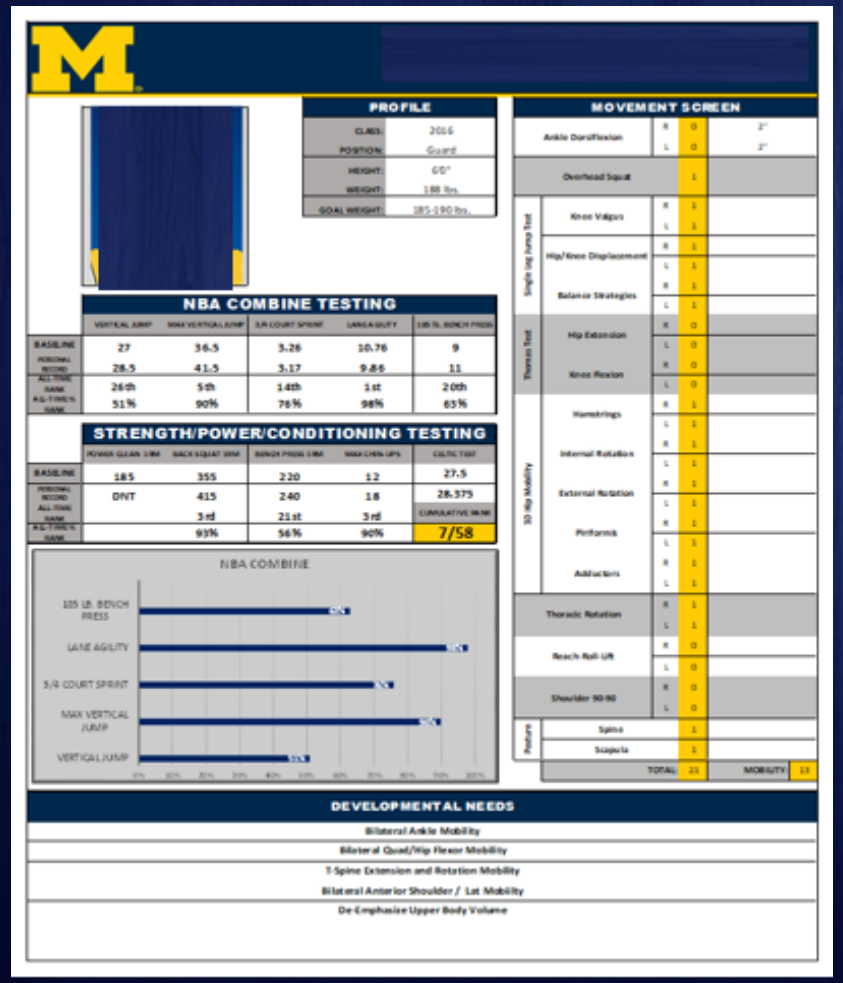
6'9" 220 LBS. FORWARD

NOTES:

- NEEDS TO GAIN 20 LBS. OF LEAN MUSCLE MASS (220-240)
- NEEDS TOTAL BODY STRENGTH DEVELOPMENT
- MOVEMENT SCREEN - INDICATES HYPERMOBILITY WITH THE EXCEPTION OF THE THORACIC SPINE
- PLAN IS TO DE-EMPHASIZE MOBILITY AND EMPHASIZE STABILITY
- CORRECT BILATERAL VALGUS DYSFUNCTION
- DEVELOP PHYSICAL TOUGHNESS

D.J. Wilson when he arrived at Michigan in 2014

PROFILE OF A RIGID ATHLETE



PROFILE

CLASS:	2016
POSITION:	Guard
HEIGHT:	6'0"
WEIGHT:	188 lbs.
GOAL WEIGHT:	185-190 lbs.

NBA COMBINE TESTING

	VERTICAL JUMP	MAX VERTICAL JUMP	3/4 COURT SPRINT	LANE AGILITY	185 lb. BENCH PRESS
BASELINE	27	36.5	3.26	10.76	9
PERSONAL RECORD	28.5	41.5	3.17	9.86	11
ALL-TIME RANK	26th	5th	14th	1st	20th
ALL-TIME% RANK	51%	90%	76%	98%	63%

STRENGTH/POWER/CONDITIONING TESTING

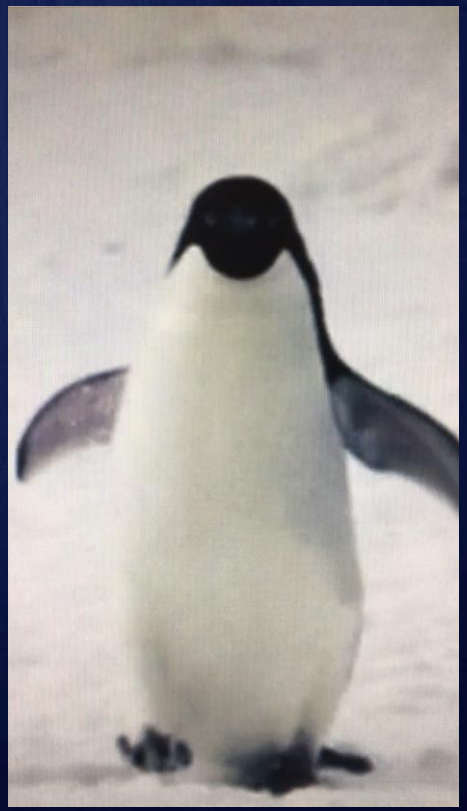
	POWER CLEAN 1RM	BACK SQUAT 5RM	BENCH PRESS 1RM	MAX CHIN UPS	CELTIC TEST
BASELINE	185	355	220	12	27.5
PERSONAL RECORD	DNT	415	240	18	28.375
ALL-TIME RANK		3rd	21st	3rd	CUMULATIVE RANK
ALL-TIME% RANK		93%	56%	90%	7/58

MOVEMENT SCREEN

Ankle Dorsiflexion	R	0	2"	
	L	0	2"	
Overhead Squat		1		
Single Leg Jump Test: Knee Valgus	R	1		
	L	1		
Single Leg Jump Test: Hip/Knee Displacement	R	1		
	L	1		
Single Leg Jump Test: Balance Strategies	R	1		
	L	1		
Thomas Test: Hip Extension	R	0		
	L	0		
Thomas Test: Knee Flexion	R	0		
	L	0		
90 Hip Mobility: Hamstrings	R	1		
	L	1		
90 Hip Mobility: Internal Rotation	R	1		
	L	1		
90 Hip Mobility: External Rotation	R	1		
	L	1		
90 Hip Mobility: Piriformis	R	1		
	L	1		
90 Hip Mobility: Adductors	R	1		
	L	1		
Thoracic Rotation	R	1		
	L	1		
Reach Roll Lift	R	0		
	L	0		
Shoulder 90-90	R	0		
	L	0		
Posture: Spine		1		
Posture: Scapula		1		
	TOTAL	21	MOBILITY	13

DEVELOPMENTAL NEEDS

- Bilateral Ankle Mobility
- Bilateral Quad/Hip Flexor Mobility
- T-Spine Extension and Rotation Mobility
- Bilateral Anterior Shoulder / Lat Mobility
- De-Emphasize Upper Body Volume



TRAINING METHODS

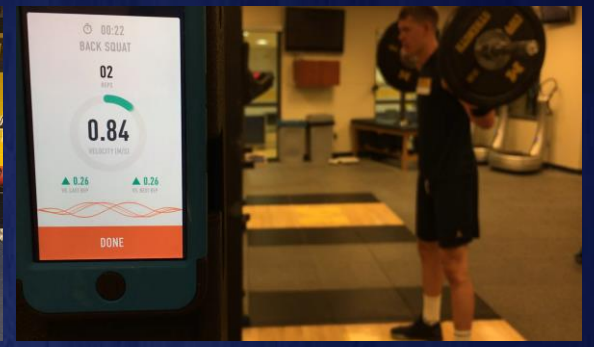
- **Strength and power development is prioritized through ground based multi-joint movements.**
  - **Overload, variation, specificity ,**
  - **Free weights over machines ,**
  - **Developing eccentric strength or the ability to decelerate our body is emphasized in our strength development**

K box is used for eccentric volume

Weight releasers are used for eccentric strength

TRAINING METHODS

- Address Individual Needs
  - Mobility, Stability, Weight Gain etc.
- Speed/Agility/Conditioning is developed in multiple ways based on our athletes needs
  - Cone agility drills, Fit Light, Versaclimber, etc.
- Implement Injury Prevention Strategies
  - Predictors of Injury-
    1. Prior Injury [1]
    2. Accumulation of Fatigue
  - Teach landing mechanics
  - Improve ankle strength/proprioception [6]
  - Postural control



TRAINING METHODS

- **Develop a strong and stable trunk/core**
  - Train in all 3 planes (sagittal,frontal,transverse)
  - Teach ability to maintain a neutral spine
  - Anti rotation, Anti extension are staples
- **Find creative ways to have fun in training**
  - Kids play sports because their fun
  - Competitions, cross training, circuits, team building etc.
- **Teach Safe and Sound Practices in the Weight Room**
  - Proper technique
  - Spotting
  - Quality over quantity
- **Challenge and Motivate Athletes**
  - Build relationships
  - Goal setting
  - Competitions
  - Accountability
  - Clear communication

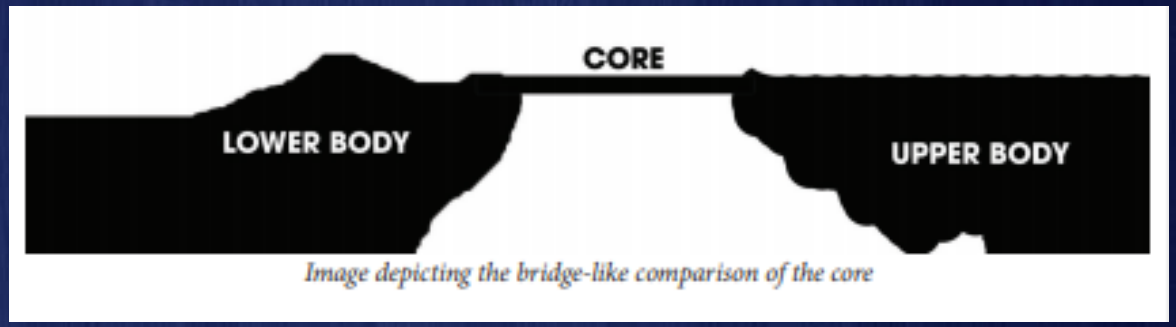
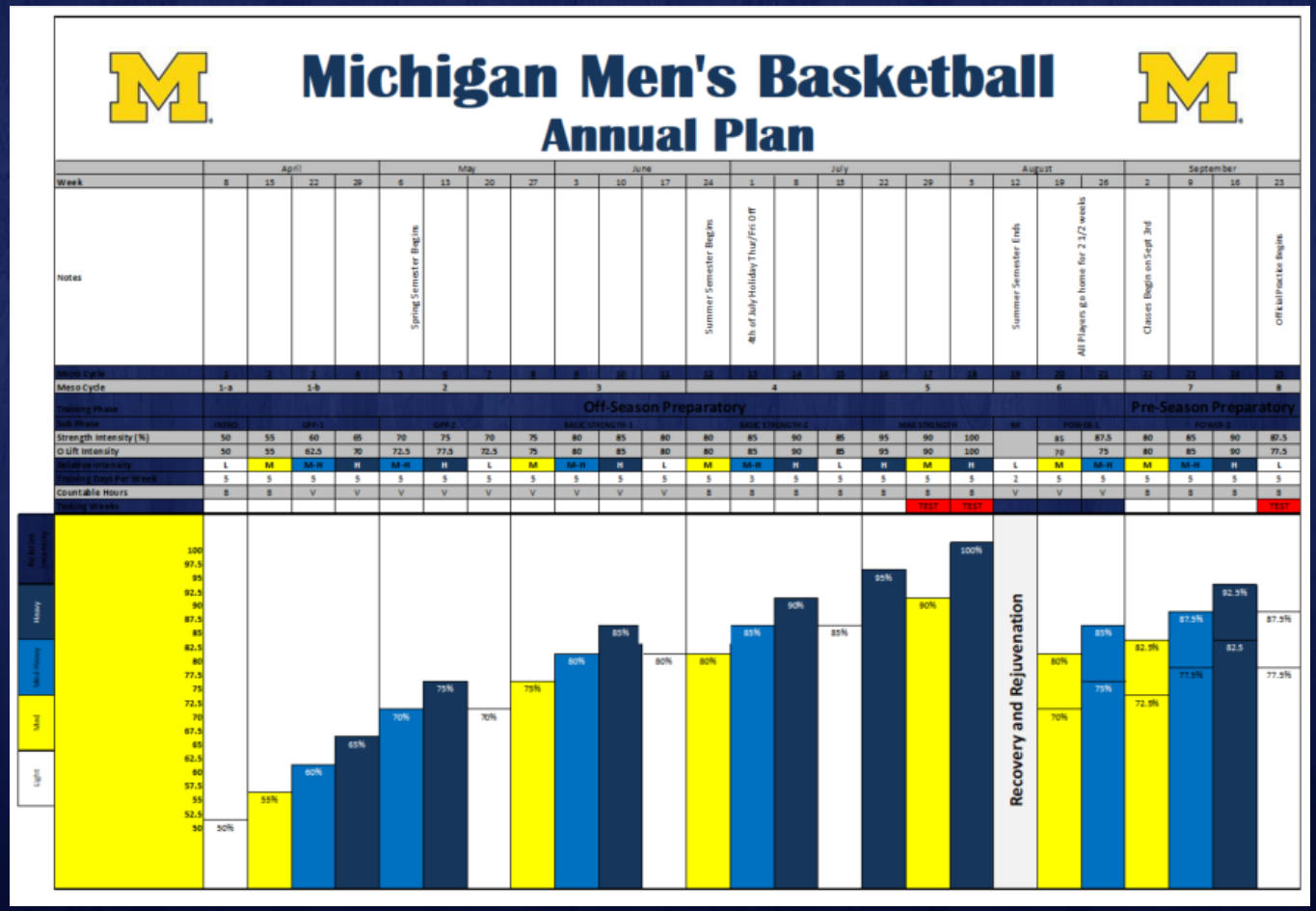


Image depicting the bridge-like comparison of the core

Competitio
n Breeds
Success!

DEVELOP THE ANNUAL PLAN



Michigan Men's Basketball
Annual Plan

	April				May				June				July				August				September			
Week	8	15	22	29	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23
Notes					Spring Semester Begins							Summer Semester Begins	4th of July Holiday Thur/Fri Off						Summer Semester Ends	All Players go home for 2 1/2 weeks		Classes Begin on Sept 3rd			Official Practice Begins
Meso Cycle	1-a	1-b			2				3				4				5			6		7			8
Training Phase	Off-Season Preparatory																					Pre-Season Preparatory			
Sub Phase	INTRO	GPP-1			GPP-2				BASIC STRENGTH-1				BASIC STRENGTH-2				MAX STRENGTH		RE	POWER-1		POWER-2			
Strength Intensity (%)	50	55	60	65	70	75	70	75	80	85	80	80	85	90	85	95	90	100		85	87.5	80	85	90	87.5
O-lift Intensity	50	55	62.5	70	72.5	77.5	72.5	75	80	85	80	80	85	90	85	95	90	100		70	75	80	85	90	77.5
Workout Intensity	L	M	M-H	H	M-H	H	L	M	M-H	H	L	M	M-H	H	L	H	M	H	L	M	M-H	M	M-H	H	L
Training Days Per Week	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	2	5	5	5	5	5	5
Countable Hours	8	8	V	V	V	V	V	V	V	V	V	8	8	8	8	8	TEST	TEST	V	V	V	8	8	8	TEST

BASE TEMPLATE- PERIODIZATION MODEL

- GPP
  - 55-75% 8-12 Reps
- Basic Strength
  - 75-90% 4-6 Reps
- Max Strength
  - 90-100% 1-3 Reps
- Power
  - O LIFTS 70-80%
  - Strength movements- PAP Schemes

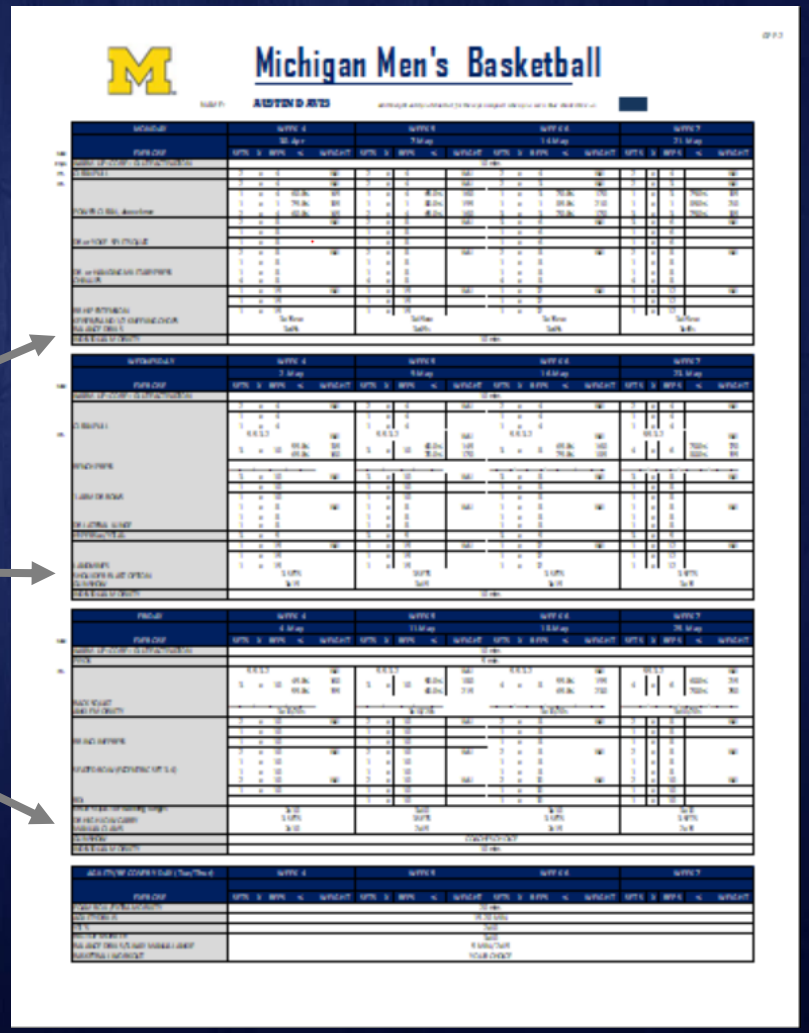
- Lift- MON-WED-FRI
- Agility /Cond- TUE-THUR
- Unload after 4-5 weeks of training

PLANNING FOR INDIVIDUAL NEEDS

Start with the base template and modify to account for individual needs.

Limited Time- Prioritize Developmental Needs

- **Weight Gain**
- **Weight Loss**
- **Reduced Upper Body Volume**
- **Mobility**
- **Stability**
- **Contact Avoiders/Rebound Staring**
- **Valgus Issues**
- **Address Injury History (i.e. ankle sprains)**
- **ETC.**



IN-SEASON CONSIDERATIONS

- Educate your athletes on the importance of training In-Season
  - They have to buy in

- Have the Pulse of Your Team
  - How do they feel today?
  - Are your players banged up? Can we work around it?
  - When do we play next?
  - How demanding have games/practices been (Catapult data)?

- Keep it simple
  - We don't need an exercise menu of 500 exercises, shorten the menu.

- Consistency (2 lifts/week)
  - Consistent stimulus of tapping into Strength

IN-SEASON CONSIDERATIONS CONT.

- Athlete autonomy
  - We give all of our rotation players an option for lower body strength movements while in-season.

- Low Volume
  - High volume training leads to excessive soreness
  - O lifts/strength movements 1-3 reps
  - Auxiliary strength movements 4-6 reps

- Moderate to Moderately High Intensity
  - Strength movements 70-90%
  - O Lifts 70-85%
  - Tapping into strength

- Develop the Scout Team Group

SAMPLE IN-SEASON MAINTENANCE LIFT

Pre-Practice 30 Min.
Foam Roll/Power Plate
Dynamic Warm-Up
Activation (Glute, Core, Scap)
Landing Series

-Explosive Movement (I.E. Power clean, weighted box jumps etc.)

-Lower Body Strength (Squat, Trap bar deadlift etc.)

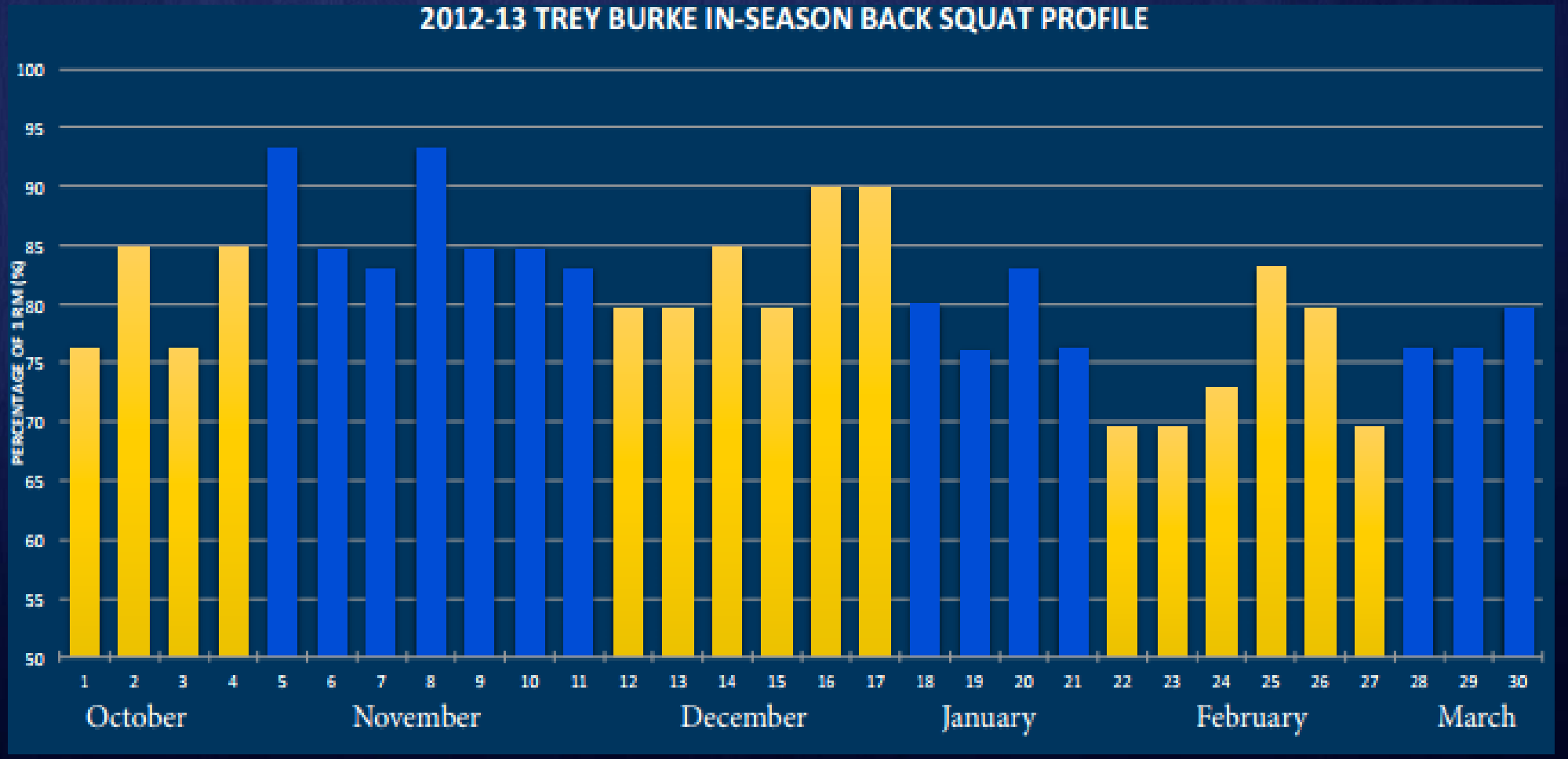
Post-Practice 15-20 Min.
-Upper Body Push
-Upper Body Pull
-Posterior Chain

-Ankle Proprioception/Strength
-Complimentary Core
-Scap Stability

Individual Mobility/Recovery

Trey Burke: 2013 National Player of the Year

- **Averaged 80% of back squat max over the course of the season.**
- **Squatted 30 times over the six-month season**



BASELINE PROFILES

BASELINE PROFILE: NIK STAUSKAS

PERFORMANCE TESTING		MOVEMENT SCREEN	
Vertical Jump:	32.0 in.	Ankle	EXCELLENT
Lane Agility:	10.97 sec.	Hip	EXCELLENT
3/4 Court Sprint:	3.48 sec.	T-Spine	EXCELLENT
Power Clean:	135 lbs.	Anterior Shoulder	EXCELLENT
Back Squat:	185 lbs.	Landing Mechanics	CLEARED
Bench Press:	165 lbs.	Knee Valgus Screen	CLEARED
Chin-Ups:	9	Postural Screen	CLEARED

6'8" 192 LBS. GUARD

NOTES:
- Athlete needs to gain 10-15 lbs. of lean muscle mass
- Severe deficits in total body strength
- Average in speed/agility/jumping
- Excellent total body joing mobility
- Needs to develop overall toughness

11

BASELINE PROFILE: D.J. WILSON

PERFORMANCE TESTING		MOVEMENT SCREEN	
Vertical Jump:	29.5 in.	Ankle	EXCELLENT
Lane Agility:	11.41 sec.	Hip	EXCELLENT
3/4 Court Sprint:	3.42 sec.	T-Spine	AVERAGE
Power Clean:	145 lbs.	Anterior Shoulder	EXCELLENT
Back Squat:	245 lbs.	Landing Mechanics	CLEARED
Bench Press:	150 lbs.	Knee Valgus Screen	FAILED
Chin-Ups:	1	Postural Screen	CLEARED

6'9" 220 LBS. FORWARD

NOTES:
- Needs to gain 20 lbs. of lean muscle mass (220-240)
- Needs total body strength development
- Movement screen - indicates hypermobility with the exception of the thoracic spine
- Plan is to de-emphasize mobility and emphasize stability
- Correct bilateral valgus dysfunction
- Develop physical toughness

5

BASELINE PROFILE: GLENN ROBINSON III

PERFORMANCE TESTING		MOVEMENT SCREEN	
Vertical Jump:	40.0 in.	Ankle	EXCELLENT
Lane Agility:	10.75 sec.	Hip	EXCELLENT
3/4 Court Sprint:	3.19 sec.	T-Spine	EXCELLENT
Power Clean:	220 lbs.	Anterior Shoulder	EXCELLENT
Back Squat:	350 lbs.	Landing Mechanics	CLEARED
Bench Press:	245 lbs.	Knee Valgus Screen	CLEARED
Chin-Ups:	12	Postural Screen	CLEARED

6'6" 213 LBS. FORWARD

NOTES:
- Athlete needs to gain 5-10 lbs. of lean muscle mass
- Excellent overall strength and explosiveness
- Excellent overall mobility

1

BASELINE PROFILE: TREY BURKE

PERFORMANCE TESTING		MOVEMENT SCREEN	
Vertical Jump:	37.5 in.	Ankle	GOOD
Lane Agility:	11.54 sec.	Hip	POOR
3/4 Court Sprint:	3.31 sec.	T-Spine	AVERAGE
Power Clean:	180 lbs.	Anterior Shoulder	AVERAGE
Back Squat:	235 lbs.	Landing Mechanics	CLEARED
Bench Press:	205 lbs.	Knee Valgus Screen	CLEARED
Chin-Ups:	8	Postural Screen	CLEARED

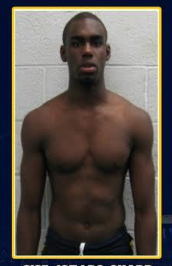
6'0" 172 LBS. GUARD

NOTES:
- Athlete needs to gain 15-20 lbs. of lean muscle mass
- Lower body strength is below average
- Severe deficits in lower body girth (skinny legs)
- Needs hypertrophy program
- Upper body strength is average
- Quiet; needs to develop vocal leadership skills
- Average joint mobility

3

BASELINE PROFILE: TIM HARDAWAY, JR.

PERFORMANCE TESTING		MOVEMENT SCREEN	
Vertical Jump:	36.0 in.	Ankle	GOOD
Lane Agility:	11.57 sec.	Hip	POOR
3/4 Court Sprint:	3.31 sec.	T-Spine	GOOD
Power Clean:	160 lbs.	Anterior Shoulder	GOOD
Back Squat:	215 lbs.	Landing Mechanics	CLEARED
Bench Press:	225 lbs.	Knee Valgus Screen	CLEARED
Chin-Ups:	9	Postural Screen	CLEARED



6'6" 185 LBS. GUARD

NOTES:
- Athlete needs to gain 15-20 lbs. of lean muscle mass
- Develop total body strength
- Improve hip flexor range of motion
- Improve quadriceps range of motion

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CATAPULT-ATHLETE TRACKING

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QUESTIONS

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