



EMORY

SPORTS MEDICINE
CENTER



PhysiMax: Clinical Application at Emory University

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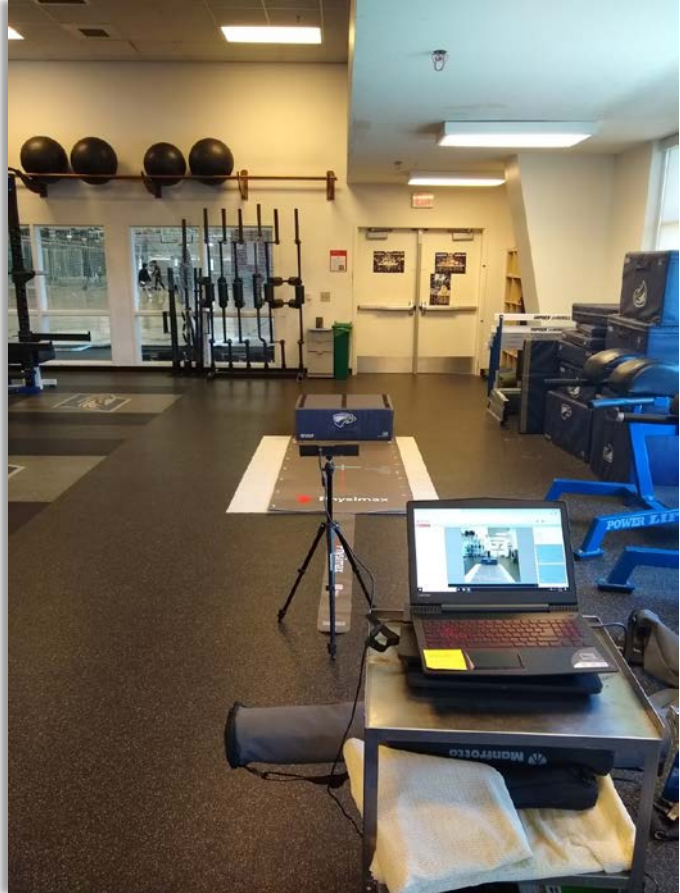


AGENDA

- Annual testing
- Interpreting and using data
- Return to sport decision making
- Current research



PHYSIMAX





BATTERY OF TESTS

- Overhead squat
- Single-leg squat
- Drop-Jump (LESS)
- Single-leg hop for distance
- Shoulder IR and ER (overhead athletes)



PHYSIMAX DATA OUTPUT: DROP JUMP TASK

Drop Jump

Total Score17	Total Score22	Knee Flexion Initial Contact L (deg)	Knee Flexion Initial Contact R (deg)	Hip Flexion Initial Contact L (deg)	Hip Flexion Initial Contact R (deg)	Trunk Flexion Initial Contact T (deg)	Lateral Trunk Flexion IC T (deg)	Medial Knee Position IC L (deg)	Medial Knee Position IC R (deg)	Maximum Medial Knee Pos. L (deg)	Maximum Medial Knee Pos. R (deg)
5 (Moderate)	6 (Moderate)	16.7	21.5	23.1	22.7	33.2	0.7	-1.8	1.6	-3.2	3.3
2 (Good)	3 (Good)	33.7	34.4	40.6	42	33.9	0.3	-9	-1.4	-8.2	4.2
5 (Moderate)	7 (Moderate)	16.3	13.6	22.1	23.1	29.5	-2.3	-2.6	-1.9	-8.4	-2.7
5 (Moderate)	5 (Moderate)	19.1	37.7	32.9	36.1	31.6	1.8	-3.2	-1.4	1	3.9
4 (Good)	5 (Moderate)	36.4	26.3	38.4	40.1	34.2	0.8	-10.1	-5.9	3	-5.1
2 (Good)	3 (Good)	31	30.3	35.2	34.4	32	0.1	-10.6	-5.1	-4.1	4.4
7 (Moderate)	10 (Poor)	25	21.4	29.4	28.4	44.2	-1.5	-0.7	-3.5	3.5	4.6
4 (Good)	4 (Good)	6.5	4.5	19.2	20.5	27.1	0.2	-1.8	3.9	0.7	12.4
3 (Good)	4 (Good)	9.6	13.5	20.4	25.2	33.5	-0.4	-5.2	-0.7	-8.9	-6.4
4 (Good)	4 (Good)	43.5	37.2	43.8	42	30.4	1.7	-3.5	2.3	-1.5	8.4
5 (Moderate)	6 (Moderate)	29.3	24.5	30.1	33.2	30.1	-4	-9.5	-7.9	2.2	5.7
4 (Good)	5 (Moderate)	25.4	18.7	30	28.9	35	0.1	-2	-3.9	4.4	2.1
3 (Good)	3 (Good)	28.6	34.6	43.7	43.3	31.8	-0.8	-2.9	-4.1	-2.1	4.3
6 (Moderate)	7 (Moderate)	20.2	21.1	33.1	34.3	32.5	-1.3	1.3	2.7	13.7	20.9
#DIV/0!	#DIV/0!	24.37857143	24.23571429	31.57142857	32.44285714	32.78571429	-0.32857143	-4.4	-1.80714286	-0.56428571	4.285714286



TEAM PERFORMANCE AND MOVEMENT QUALITY METRICS: YEAR TO YEAR COMPARISON

Single-leg Hop 2018-19				Single-leg Hop 2019-20			
Avg Distance							
Right	68.23			Right	60.3		
Left	70.7			Left	60.27		
Maximal Knee Flexion							
Right	48.23			Right	50.02		
Left	50.65			Left	51.39		
Hip Flexion							
Right	20.23			Right	22.64		
Left	23.4	0.86452991		Left	22.08		
Medial Knee Position							
Right	9.85			Right	10.84		
Left	8.23	0.83553299		Left	5.18	0.47785978	
Lateral Pelvic Angle							
Right	8.89			Right	-12.88		
Left	17.17	0.51776354		Left	15.29		
Trunk Lateral Flexion							
Right	11.08			Right	9.77		
Left	-10.91			Left	-11.55		

Drop Jump 2018-2019				Drop Jump 2019-2020			
Avg Score							
5.428571429 (Moderate)				4.21428571 (Good)			
Knee Flexion at IC							
Right	16.49			Right	24.24		
Left	16.86			Left	24.38		
Medial Knee Position at IC							
Right	-1.71			Right	-1.81		
Left	-3.29	0.51975684		Left	-4.4	0.41136364	
Maximal Medial Knee Position							
Right	5.3			Right	4.28		
Left	0.94	0.17735849		Left	-0.56	-0.13084112	



BASEBALL SHOULDER RANGE OF MOTION: YEAR TO YEAR COMPARISON

Right Hand Dominant			
Shoulder Rotation ROM 2018-2019		Shoulder Rotation ROM 2019-2020	
Internal Rotation			
Right	67.692	Right	57.93333
Left	71.78	Left	65.06
External Rotation			
Right	107.332	Right	105.575
Left	96.996	Left	96.512
Total Arc			
Right	175.024	Right	163.5083
Left	168.776	Left	161.572

Left Hand Dominant			
Shoulder Rotation ROM 2018-2019		Shoulder Rotation ROM 2019-2020	
Internal Rotation			
Right	82.45	Right	81.075
Left	67	Left	65.5
External Rotation			
Right	97.95	Right	97.125
Left	103.25	Left	110.25
Total Arc			
Right	180.4	Right	178.2
Left	170.25	Left	175.75



RETURN TO SPORT READINESS: CASE DISCUSSION

Single-Leg Hop for Distance

Academic Year	Test Breakdown	Distance jumped T (inches)	2. Maximal knee flexion T (deg)	3. Maximal hip flexion T (deg)
2019-2020	L	57.7	46.9	20.6
	R	58.1	30.8	12.1
2018-2019	L	77.2	32.9	11.8
	R	75.2	59.1	29.9

Drop Jump

Academic Year	Total Score17	Total Score22	Knee Flexion Initial Contact L (deg)	Knee Flexion Initial Contact R (deg)	Hip Flexion Initial Contact L (deg)	Hip Flexion Initial Contact R (deg)
2019-2020	7 (Moderate)	9 (Poor)	38.4	36.1	40.7	40
2018-2019	4 (Good)	5 (Moderate)	43.6	41.7	44.9	42.0



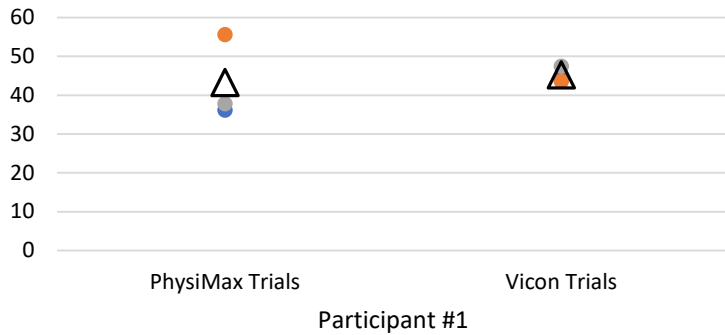
CURRENT RESEARCH

- PhysiMax compared to the Vicon Motion Capture System
- Can PhysiMax identify student-athletes with an increased risk of injury?

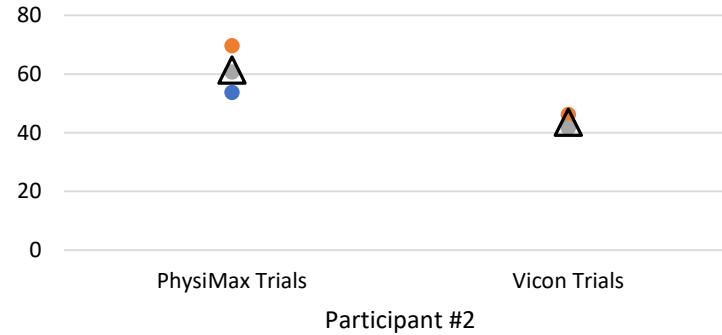


PRELIMINARY COMPARISON OF PHYSIMAX WITH VICON MOTION CAPTURE SYSTEM: SINGLE-LEG HOP

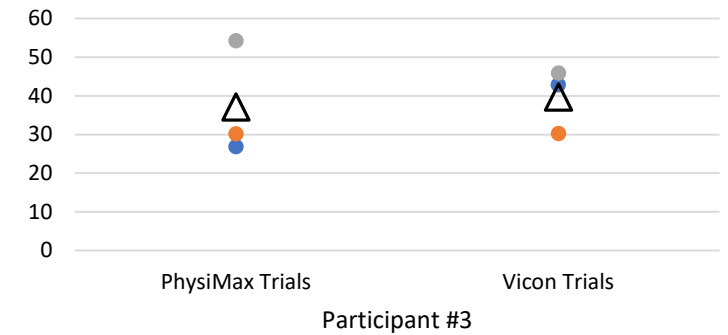
SL Hop for Distance: Left Knee Flexion per Trial



SL Hop for Distance: Left Knee Flexion per Trial



SL Hop for Distance: Left Knee Flexion per Trial





CONCLUSION

In Summary:

- PhysiMax is user-friendly and efficient
- Assists those in busy athletic settings

To Be Determined:

- Can PhysiMax identify asymmetries that are associated with a higher injury risk?
- Can PhysiMax be used to assist clinicians in return to sport decision making?



THANK YOU!

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