



LEARNING OBJECTIVES

- + Discuss the importance of using an assessment to identify the training focus.
- + Define the key elements to the Explosive Strength Deficit.
- + Review and discuss the results and application of the results in training program.

01

IDENTIFYING WEAK LINKS

- ✦ The need for assessment to identify training focus.



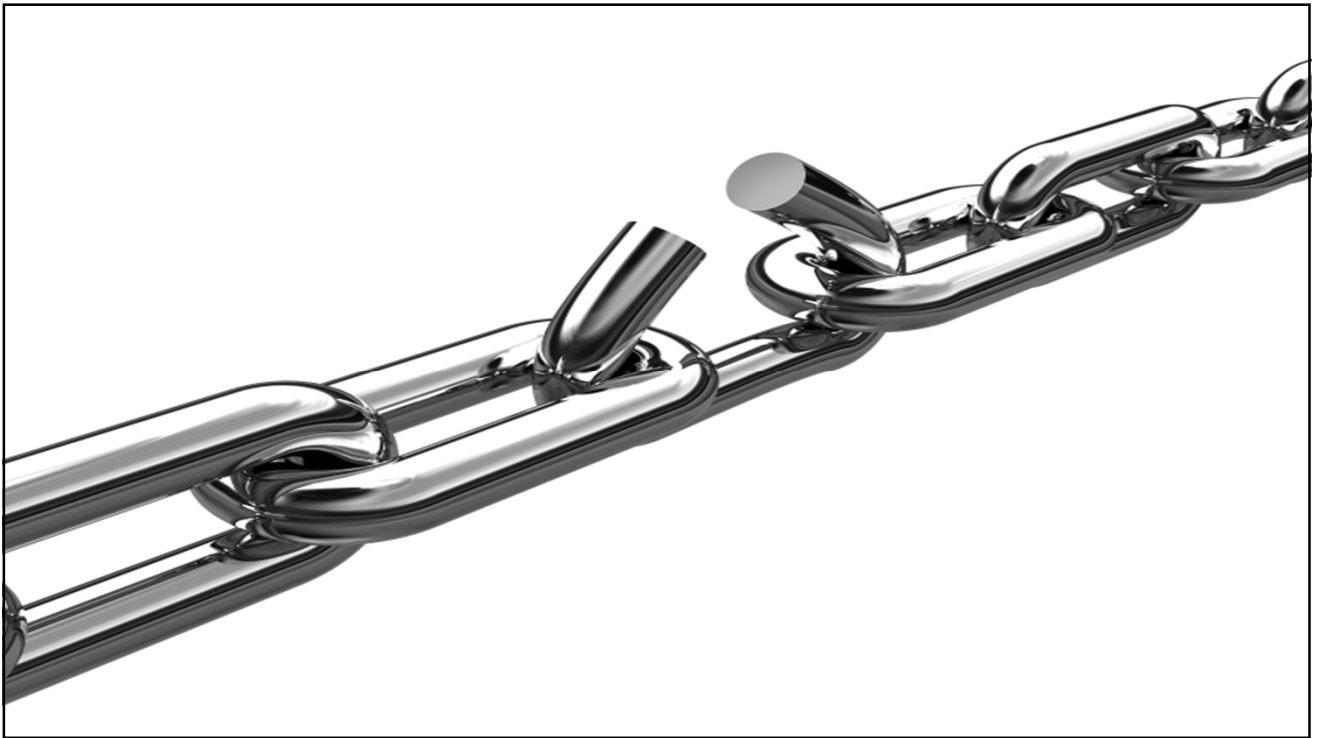
Slide 4

J1

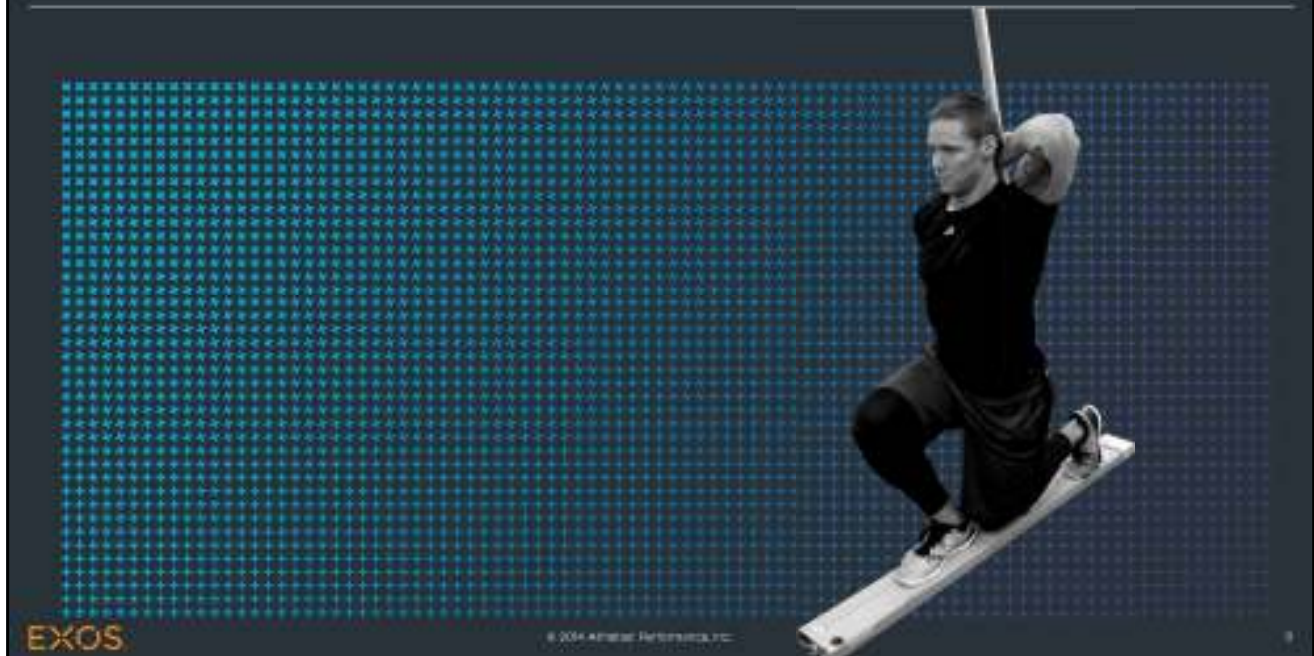
shotgun (approach)

John, 6/19/2014

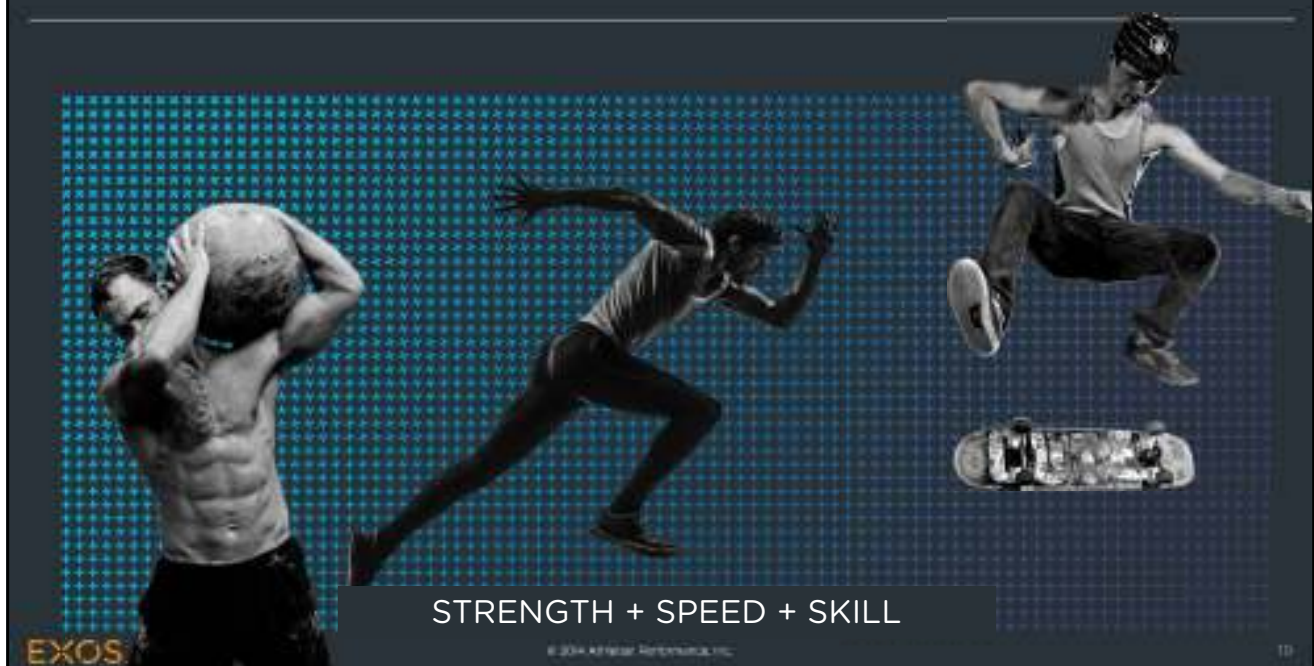




FUNCTIONAL MOVEMENT SCREENING



NEEDS OF SPORT



STRENGTH + SPEED + SKILL

IN SUMMARY

Just as athletes have an assessment/screen to identify movement limitations, there is a need for similar screening to identify strength needs for programming.

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CHECK FOR LEARNING

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- + List 2-3 ways that you are currently testing for either Strength or Power and how the results you're getting are directly affecting your programming.
- + Ask yourself, are those tests and results actually addressing weak links or just establishing a baseline of what the client or athlete can do in a given movement?



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ASSESSING STRENGTH NEEDS

EXPLOSIVE STRENGTH DEFICIT





STRENGTH DEFICIT

- + Strength Deficit - The difference between **Maximum Strength** (voluntary effort) and **Absolute Strength** (involuntary effort).
 - + The closest one can approach involuntary recruitment of as many muscle fibers is to force the body to react by reflex to a suddenly imposed load...
-
- + Thus, an appropriate measure of strength deficit can be made by comparing vertical jump achieved from a static start with hips and knees flexed (*non-countermovement*), to a vertical jump preceded by a sudden dip (*countermovement*).

STRENGTH PROFILES MEASURED

- + Starting Strength - The ability of the muscles to develop force at the beginning of the working contraction before external movement occurs.
 - Assessed through a Non-Countermovement Jump
- + Explosive Strength - displayed when the contraction of the working muscles in fundamental exercises is preceded by mechanical stretching. This specific quality of the muscle is called **reactive ability**.
 - Assessed through a Countermovement Jump

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EXPLOSIVE STRENGTH DEFICIT

Non-Countermovement Jump



- + Focus on pause at the bottom of the movement to eliminate pre-stretch
 - Functions as the determinant of **starting strength** (Contractile) in assessing deficit.

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EXPLOSIVE STRENGTH DEFICIT

Countermovement Jump



- + Focus on linking concentric motion with the eccentric motion to gain contribution from pre-stretch
 - Functions in determining **reactive ability** (elastic) in assessing deficit.

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IN SUMMARY

- + The Explosive Strength Deficit is the difference between Maximal (Voluntary) Strength and Absolute (Involuntary) Strength
- + The two execution types of the Vertical Jump, Non-Countermovement and Countermovement, are used to identify an athlete's deficit.

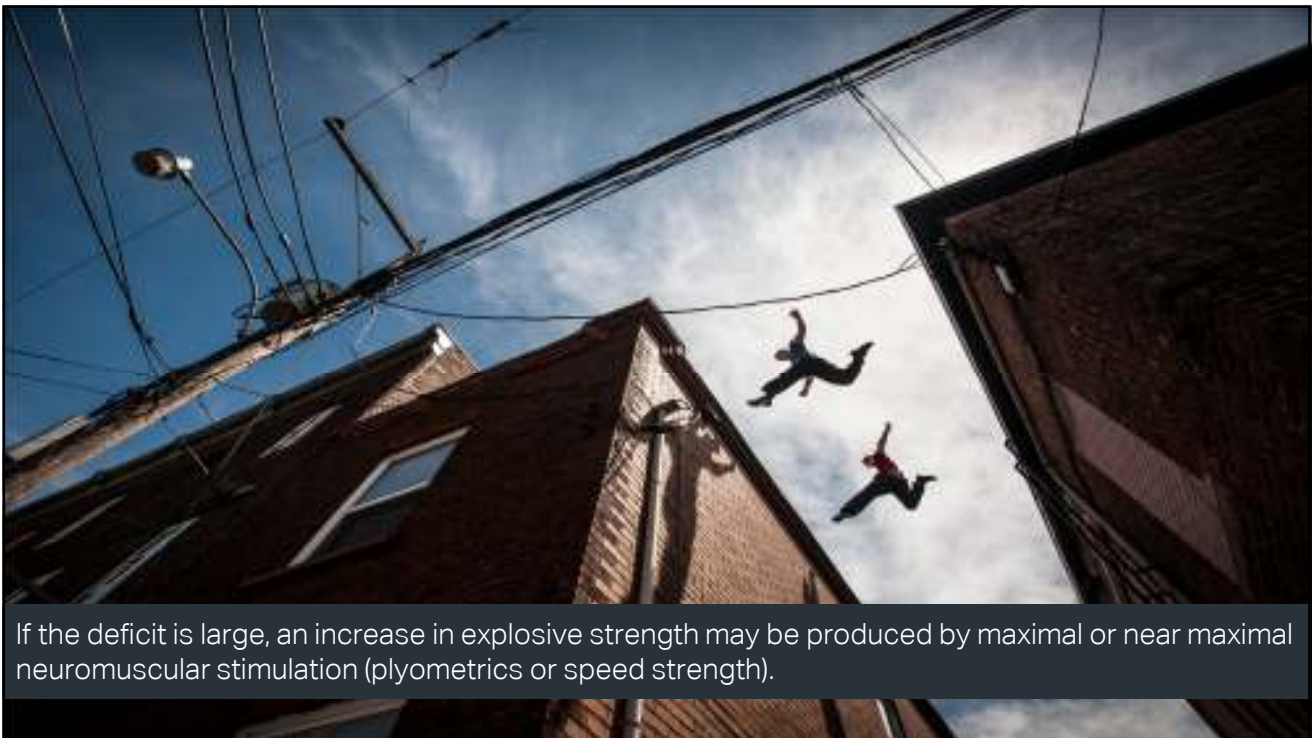
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INTERPRETING THE RESULTS



If the deficit is large, an increase in explosive strength may be produced by maximal or near maximal neuromuscular stimulation (plyometrics or speed strength).

LARGE DEFICITS

VERTICAL JUMP				
Name	Reach (in)	NCM	CM	NCM/CM (EUR)
Athlete 1	88.5	33.5	34	1.47%
Athlete 2	88	28.5	31	8.06%
Athlete 3	95.5	23.5	25.5	7.84%
Athlete 4	92	19.5	19	-2.63%
Athlete 5	84	15.5	17	8.82%
Athlete 6	84.5	22.5	21.5	-4.65%
Athlete 7	84	20.5	22	6.82%
Athlete 8	82	15	16	6.25%
Athlete 9	88	26	26	0.00%
Athlete 10	90	21.5	23	6.52%
Plyometrics and Speed Strength become the training focus.				4.08%
				1.89%
				6.25%
				7.14%
Athlete 14	86	26	28	7.14%
Athlete 15	89	24	23.5	-2.13%
Athlete 16	91	25.5	25.5	0.00%
Athlete 17	96.5	25.5	26	1.92%
Athlete 18	96.5	25.5	26.5	3.77%
Athlete 19	88.5	27.5	27.5	0.00%
Athlete 20	100.5	22.5	24	6.25%



SMALL DEFICITS

VERTICAL JUMP				
Name	Reach (in)	NCM	CM	NCM/CM (EUR)
Athlete 1	88.5	33.5	34	1.47%
Athlete 2	88	28.5	31	8.06%
Athlete 3	95.5	23.5	25.5	7.84%
Athlete 4	92	19.5	19	-2.63%
Athlete 5	84	15.5	17	8.82%
Athlete 6	84.5	22.5	21.5	-4.65%
Athlete 7	84	20.5	22	6.82%
Athlete 8	82	15	16	6.25%
Athlete 9	88	26	26	0.00%
Hypertrophy and maximal strength (heavy loads) become the training focus.			23	6.52%
			24.5	4.08%
			26.5	1.89%
Athlete 13	88	22.5	24	6.25%
Athlete 14	86	26	28	7.14%
Athlete 15	89	24	23.5	-2.13%
Athlete 16	91	25.5	25.5	0.00%
Athlete 17	96.5	25.5	26	1.92%
Athlete 18	96.5	25.5	26.5	3.77%
Athlete 19	88.5	27.5	27.5	0.00%
Athlete 20	100.5	22.5	24	6.25%

EPLEY FORMULA

For determining 1RM

- + Repetition based formula for discovering 1 Rep Max in compound exercises
- + Developed by Boyd Epley and presented in 1985
- + $(\text{Load} \times \text{Reps} \times .033) + \text{Load} = 1 \text{ Rep Max}$
- + Once 1RM is discovered, the appropriate percentage of intensity necessary to develop specific strength qualities can be applied in training.

IN SUMMARY

- ✦ The resulting jump profiles can guide us on what the focus of training should be.
- ✦ If the deficit is large (meaning the numbers are close together), then Speed-Strength work should be the focus.
- ✦ If the deficit is small (meaning the numbers are far apart from NCM-CM) then Maximal/Starting Strength work should be the focus.

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CHECK FOR LEARNING

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- ✦ List 3-5 Speed-Strength movements that you could use to develop Explosive-Strength (and Reactive Ability) if your client presents a Large Deficit.
- ✦ List 3 Hypertrophy and 3 Max Strength movements that you could use to develop Starting Strength if your client presents a Small Deficit.
- ✦ Utilizing the Epley Formula, the corresponding Strength Quality Percentages and The Explosive Strength Deficit test, write a 3 day program targeting the Strength and Power weak links of a client or athlete



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CLOSING

IDENTIFY WEAK LINKS

ASSESS STRENGTH NEEDS

INTERPRET RESULTS

- + Each sport has varying demands from an athlete requiring strengths in specific areas.
 - Instead of taking a 'shotgun' approach, we need to take precise, targeted action to identify the needs of our athletes.
 - In order to keep an athlete in the game for as long as possible, we must target and strengthen weak links.

IDENTIFY WEAK LINKS

ASSESS STRENGTH NEEDS

INTERPRET RESULTS

- + Understanding how power and strength are quantified in training, and then translated into sport, equips a coach to optimize an athlete's performance.
- + Assessing a strength deficit can shed light on the training needs of an athlete.
 - We must be able to assess and interpret the results of a strength deficit assessment to understand an athlete's readiness to perform in sport.

IDENTIFY WEAK LINKS

ASSESS STRENGTH NEEDS

INTERPRET RESULTS

- + Understanding the results of an explosive strength deficit assessment will empower the coach to best prepare an athlete.
 - Large explosive strength deficits are an indicator of a better need for a neuromuscular connection.
 - A coach should be able to incorporate skills like plyometrics and speed strength movements to decrease the deficit.
 - Small explosive strength deficits are an indicator of a need for starting strength.
 - A coach should incorporate maximal strength and hypertrophy training to best prepare the athlete.



APPENDIX

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