

ทารตอบสนองทางสรีรวิทยา ต่อทารออกทำลังทายแบบ "ที โฟทัส 25"

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บทคัดย่อ

"โฟกัส T25" เป็นโปรแกรมการออกกำลังกายระดับหนัก ผลิตโดยบริษัท บีชบอดี้ โดย ชอน ที ซึ่งเป็นผู้สร้าง โปรแกรม อินแซนนิตี้ ที่เป็นที่นิยมอย่างมากเช่นกัน แต่ใช้เวลานานกว่าเล็กน้อย "โฟกัส T25" เป็นโปรแกรมที่ใช้เวลา 25 นาที ที่มีการยืดร่างกายประมาณ 5 นาที ภายหลังออกกำลังกาย ทั้งนี้ ชอน ที ใช้คำว่า "โฟกัส" นำหน้า เพราะเป็นโปรแกรม การออกกำลังกายที่เน้นท่าและจังหวะของการออกกำลังกาย ที่ทำให้สร้างกล้ามเนื้อและลดไขมันได้มากที่สุด ในเวลา 25 นาที โดยสรุปแล้ว "โฟกัส T25" มีผลเพิ่มความแข็งแรง พลัง และความอดทนของกล้ามเนื้อทั้งร่างกาย เพิ่มความอดทนของ ระบบหัวใจและระบบหายใจ เพิ่มความเร็ว สมดุลการทรงตัว ความยืดหยุ่น และการควบคุมอุณหภูมิร่างกาย ดังนั้น "โฟกัส T25" จึงน่าจะมีบทบาทในการสร้างเสริมสุขภาพได้ อย่างไรก็ตามหากทำไม่ถูกวิธี อาจทำให้เกิดอันตรายได้ เพราะมีระดับ การออกกำลังกายที่หนักมาก และมีการกระโดดต่อเนื่องกันเป็นเวลานาน หากร่างกายไม่พร้อม ย่อมทำให้กล้ามเนื้อและ เอ็นฉีกขาด เมื่อยล้า ข้อเสื่อม หน้ามืด เป็นลม หรือ หัวใจหยุดเต้นได้ บทความนี้จึงได้สรุปประโยชน์ของ "โฟกัส T25" และ ข้อควรระวัง รวมทั้งการหยุดการออกกำลังกาย เพื่อให้ผู้ออกกำลังกายด้วยโปรแกรมการออกกำลังกายนี้ได้ประโยชน์ อย่างเต็มที่โดยไม่เกิดอันตรายแก่ร่างกาย

คำสำคัญ: การออกกำลังกายระดับหนัก ความแข็งแรง ความอดทน การทรงตัว การลดน้ำหนัก

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Physiological responses to "Focus T25"

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Abstract

"Focus T25" is a high-intensity exercise program. It is produced by beach body and led by world renowned personal trainer Shaun-T. Shaun-T was the program creator of the incredibly popular Insanity program which is a bit longer in duration. "Focus T25" takes around 25 minutes with 2-5 minutes of stretching after 25-minute workout. The word "focus" was used because Shaun T has chosen the most effective exercise combinations that will build and burn a large number of muscles and fat in the quickest time possible within 25 minutes. Overall, "Focus T25" increases muscular strength, power and endurance, cardiorespiratory endurance, speed, balance and flexibility. In addition, it improves body temperature regulation. Therefore, it could be benefit for health promotion. However, if we do it wrong we may get injury from its high intensity and jumping. If the exercisers are not fit enough we may experience muscle and tendon injuries, fatigue, joint pain, faint or heart failure. Beneficial physiological effects of "Focus T25" following by precaution and termination of the exercise are summarized. This may help exercisers gain full benefit from "Focus T25" with safety.

Keywords: high intensity exercise, strength, endurance, balance, weight reduction

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At this moment in Thailand, there is no exercise program popular than "FocusT25" for anyone who loves the intense weight and cardio workouts. "Focus T25" is produced by beach body and led by world renowned personal trainer Shaun-T. Shaun-T was the program creator of the incredibly popular Insanity program which is a bit longer in duration. "Focus T25" takes around 25 minutes with 2-5 minutes of stretching after 25-minute workout. The word "focus" was used because Shaun T has chosen the most effective exercise combinations that will build and burn a large number of muscles and fat in the quickest time possible within 25 minutes¹. The exercisers do not stop once the DVD starts up.

However, "Focus T25" has two sides; benefit if we do it right but dangerous if we do it wrong. So I start from summarizing the beneficial physiological effects of "Focus T25" following by precaution and termination of the exercise. This may help exercisers gain full benefit from "Focus T25" with safety.

■ Beneficial physiological effects

World Health Organization recommended that vigorous-intensity activities at least 3 days per week; and activities that strengthen muscle and bone at least 3 days per week provides greater health benefit². "Focus T25" is a high-intensity exercise program. It involves high impact moves that engage all areas of exerciser's core, major muscle groups like quadriceps, calves and hamstrings, trunk and the upper body. Overall, "Focus T25" increases muscular strength, power and endurance, cardiorespiratory endurance, speed, balance and flexibility. In addition, it improves body temperature regulation. Therefore, it could be benefit for health promotion.

In order to have these capacities, our bodies need energy supply. Only one molecule that can immediately provide energy is adenosine triphosphate (ATP). However, the body cannot easily store ATP (and what is stored gets used up within a few seconds), it is necessary to continually synthesize ATP during exercise.

Generally, the two major ways the body converts nutrients to energy are^{3,4} (Figure 1): aerobic metabolism (with oxygen) and anaerobic metabolism (without oxygen). Carbohydrate (CHO) is the main nutrient that provides energy during a high-intensity exercise via anaerobic glycolysis or aerobic pathway, while fat can provide energy during a low-intensity exercise for long periods of time via aerobic pathway (Figure 2)5-9. Proteins are generally used to maintain and repair body tissues, and are not normally used to power muscle activity. However, Thai healthy sedentary subjects relied more on CHO than fat during all⁹ (Figure 3). The greater daily proportional CHO intake in Thai subjects than that in white subjects may be responsible for the greater CHO utilization. Thus, not only the intensity and duration of the exercise determine which method gets used but

In addition, "Focus T25" is the program that follows the overload training principle 10. Anyone who cannot adapt to the program will fail to continue the training because he/she has muscle injury, illness, pain, atrophy, increased cortisol and decreased physical performance¹⁰. However, anyone who can adapt to the program will gain benefits from the training 11,12. These include hypertrophy of muscle fiber type I and IIa because it plays important role during the high intensity exercise for nearly 30 minutes ¹⁰ (Table 1). This contributes to improve performance (Figure 4). Left ventricle muscle mass and chamber volume are increased. Mitochondria content (Figure 5), size and function, fat utilization during the exercise was increased leading to CHO sparing¹³. Faster duration rates of oxygen diffusion and fuel into muscle. Oxidative enzyme level and efficiency and disposal of metabolic waste were also increased. Cell regulatory mechanism of metabolism was improved. Moreover, the exercise training increases insulin sensitivity¹⁵⁻¹⁸ via 3 possible mechanisms (Figure 6); 1) increased glucose transporter 4 exocytosis from its vesicle 2) decreased glucose transporter 4 endocytosis and 3) increased glucose transporter 4 activity.

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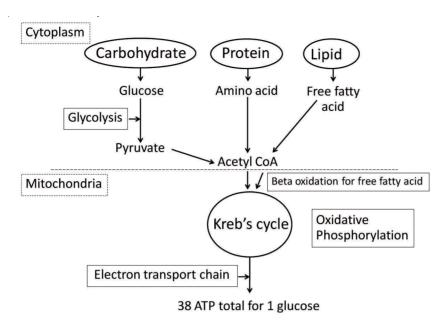


Figure 1 Energy pathway (modified from refs^{4, 5})

Table 1 Characteristics of skeletal muscle fiber types (modified from ref¹¹)

Differences In Skeletal Muscle Fiber Types

Features	Type I fibers	Type II a fibers	Type II x fibers	Type II b fibers
Contraction time	Slow	Moderately Fast	Fast	Very fast
Resistance to fatigue	High	Fairly high	Moderate	Low
Activity Used for	Aerobic activity	Long-term anaerobic activity	Short-term anaerobic activity	Short-term anaerobic activity
Maximum duration of use	Hours	Less than 30 minutes	Less than 5 minutes	Less than 1 minute
Power produced	Low	Medium	High	Very high
Mitochondrial density	Very High	High	Medium	Low
Capillary density	High	Intermediate	Low	Low
Oxidative capacity	High	High	Moderate	Low
Major storage fuel	ATP, Triglycerides	ATP, Creatine phosphate, glycogen	ATP, Creatine phosphate, glycogen (little)	ATP, Creatine phosphate







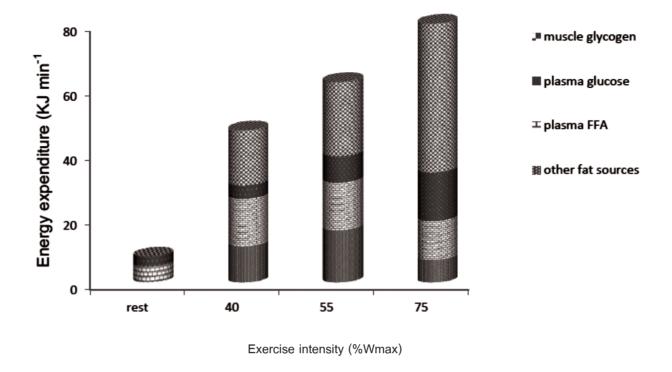


Figure 2 Substrate utilization in trained white subjects (modified from refs^{6-8})

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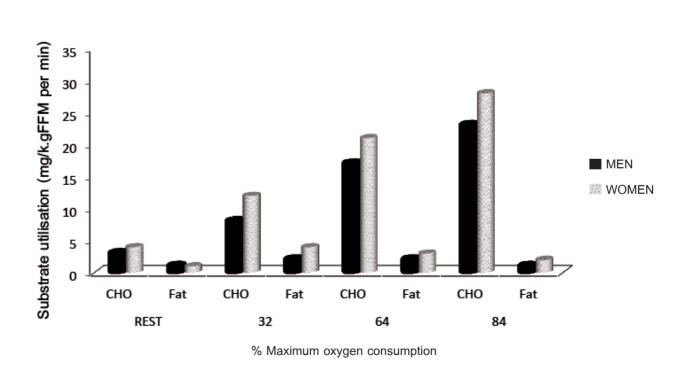


Figure 3 Substrate utilization in healthy sedentary Thai subjects (modified from ref¹⁰)

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Faster diffusion of oxygen and fuel into muscle

Increased expression of fatique-resistance of slow twitch muscle fibers

Increased mitochondrial function

Increased cardiac muscle mass

Increased left ventricular dilation and chamber volume



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Increased disposal of metabolic waste

Increased stroke volume

Increase carbohydrate sparing

Increased oxidiative enzyme level and efficiency

Improved cell regulatory mechanisms of metabolism

 $\textbf{Figure 4} \ \ \textbf{Physiological changes from high-intensity exercise (modified from refs^{12,\,13})}$

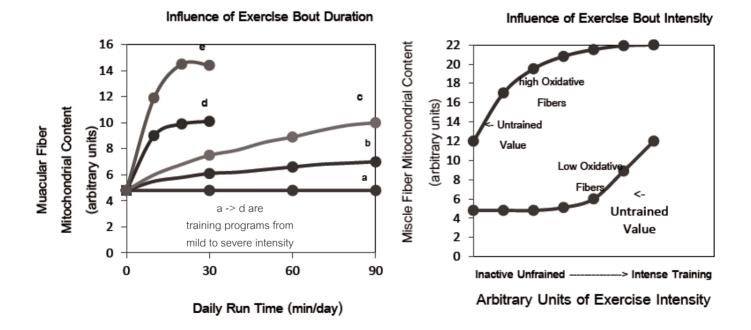


Figure 5 Influences of exercise bout and duration and intensity on muscle fiber content (modified from ref¹⁵)

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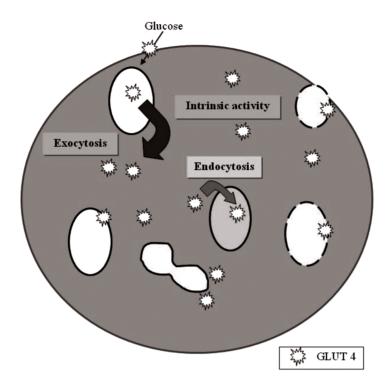


Figure 6 Ways to regulate glucose transporter 4 (modified from ref¹⁷)

In addition, "Focus T25" is a successful program because it also encourages nutrition program. This controls balanced energy intake and expenditure. Nutritional "Focus T25" Meal Plan and a "Focus T25" 5 Day Fast Track meal Plan really keep it simple on what to eat and when to eat it. This helps the exercisers successful in gaining body shape and health.

■ Precaution

If the exercisers do it wrong such as performing without enough warming up or preparation (dress, shoes and food intake) or too much effort at the first start they may have muscle pain, fatigue or injury. They have to be careful about the jumping part by not jumping too high. This may prevent them from continuing the exercise.

In addition, the exerciser should stop the exercise if they have symptoms as recommended by the American College of Sport Medicine (ACSM).

■ American College of Sport Medicine (ACSM) Indications for Termination of an Exercise Test²²

These indications for termination of an exercise test consists of 2 categories; absolute and relative indications.

■ Absolute Indications

- Suspicion of a myocardial infarction or acute myocardial infarction (heart attack)
- 2. Onset of moderate-to-severe angina (chest pain)
- Drop in systolic blood pressure (SBP) below standing resting pressure or drop in SBP with increasing workload accompanied by signs or symptoms
- Signs of poor perfusion (circulation or blood flow), including pallor (pale appearance to the skin), cyanosis (bluish discoloration), or cold and clammy skin
- 5. Severe or unusual shortness of breath



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- CNS (central nervous system) symptoms

 e.g., ataxia (failure of muscular coordination), vertigo (an illusion of dizzying movement), visual or gait (pattern of walking or running) problems, confusion
- 7. Serious arrhythmias (abnormal heart rhythms)
 e.g., second / third degree AV block,
 atrial fibrillation with fast ventricular
 response, increasing premature ventricular contractions or sustained ventricular tachycardia
- 8. Technical inability to monitor the ECG
- 9. Patient's request (to stop)

■ Relative Indications

- 1. Any chest pain that is increasing
- 2. Physical or verbal manifestations of shortness of breath or severe fatigue
- 3. Wheezing
- 4. Leg cramps or intermittent claudication (grade 3 on a 4-point scale)
- Hypertensive response (SBP >260 mm Hg; DBP >115 mm Hg)
- 6. Pronounced ECG changes from baseline

 It is >2 mm of horizontal or down sloping ST-segment depression, or

- >2 mm of ST-segment elevation (except in aVR)
- 7. Exercise-induced bundle branch block that cannot be distinguished from ventricular tachycardia
- 8. Less serious arrhythmias (abnormal heart rhythms) such as supraventricular tachycardia

■ Keys for success with "Focus T25"

- 1. If you are older than 35 years old you should receive physical examination by a doctor before starting "Focus T25" program.
- 2. Start with active warming up and finish with cool down by active stretching for at least 5 minutes.
- 3. Following the DVD at your own pace and even stop exercising if you feel cannot perform it. This is important for injury prevention.
- 4. If you have muscle pain during the first few days, you should first use cold pack to alleviate pain and followed by massaging together with hot pack.
- 5. Get some antioxidant or protein supplementation in the first 30 minutes to help with recovery. 19-21

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