

Developing a Training Foundation

Chapter 5

Training Programs

Week	Day	Time	Distance	Speed	Heart Rate	Calories	Notes
1	Mon	6:00	3.0	10:00	150	300	Easy run
1	Tue	6:00	3.0	10:00	150	300	Easy run
1	Wed	6:00	3.0	10:00	150	300	Easy run
1	Thu	6:00	3.0	10:00	150	300	Easy run
1	Fri	6:00	3.0	10:00	150	300	Easy run
1	Sat	6:00	3.0	10:00	150	300	Easy run
1	Sun	6:00	3.0	10:00	150	300	Easy run
2	Mon	6:00	3.0	10:00	150	300	Easy run
2	Tue	6:00	3.0	10:00	150	300	Easy run
2	Wed	6:00	3.0	10:00	150	300	Easy run
2	Thu	6:00	3.0	10:00	150	300	Easy run
2	Fri	6:00	3.0	10:00	150	300	Easy run
2	Sat	6:00	3.0	10:00	150	300	Easy run
2	Sun	6:00	3.0	10:00	150	300	Easy run
3	Mon	6:00	3.0	10:00	150	300	Easy run
3	Tue	6:00	3.0	10:00	150	300	Easy run
3	Wed	6:00	3.0	10:00	150	300	Easy run
3	Thu	6:00	3.0	10:00	150	300	Easy run
3	Fri	6:00	3.0	10:00	150	300	Easy run
3	Sat	6:00	3.0	10:00	150	300	Easy run
3	Sun	6:00	3.0	10:00	150	300	Easy run
4	Mon	6:00	3.0	10:00	150	300	Easy run
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4	Sat	6:00	3.0	10:00	150	300	Easy run
4	Sun	6:00	3.0	10:00	150	300	Easy run
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6	Fri	6:00	3.0	10:00	150	300	Easy run
6	Sat	6:00	3.0	10:00	150	300	Easy run
6	Sun	6:00	3.0	10:00	150	300	Easy run
7	Mon	6:00	3.0	10:00	150	300	Easy run
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7	Wed	6:00	3.0	10:00	150	300	Easy run
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7	Sat	6:00	3.0	10:00	150	300	Easy run
7	Sun	6:00	3.0	10:00	150	300	Easy run
8	Mon	6:00	3.0	10:00	150	300	Easy run
8	Tue	6:00	3.0	10:00	150	300	Easy run
8	Wed	6:00	3.0	10:00	150	300	Easy run
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10	Sun	6:00	3.0	10:00	150	300	Easy run

This chapter is geared towards the novice runner.

But there is good information to review in here for all levels.

10k Training Schedule

Week/Day	1	2	3	4	5	6	7	Total
1	3	3	3	3	3	3	3	21
2	3	3	3	3	3	3	3	21
3	3	3	3	3	3	3	3	21
4	3	3	3	3	3	3	3	21
5	3	3	3	3	3	3	3	21
6	3	3	3	3	3	3	3	21
7	3	3	3	3	3	3	3	21
8	3	3	3	3	3	3	3	21
9	3	3	3	3	3	3	3	21
10	3	3	3	3	3	3	3	21

Training Programs

- This chapter has a lot of anecdotal information.
 - Anecdotal: Based upon personal observation.
 - Empirical: Derived from experiment.
- Examine the physiology behind the different steps and laws.
- The importance of this chapter is related to these points:
 - Running is a good exercise to improve fitness
 - Runners get injured

Step One:

Analyze Motivation and Discipline

- Why start a training program?
 - Weight loss? Fitness? 5K time?
 - Set goals in line with motivation
- In many cases, people who start a run training program are changing their lifestyle.



Step One:

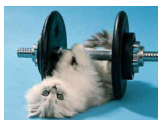
Analyze Motivation and Discipline

- Establish a plan to reinforce positive changes in behavior.
 - Shaping: the new target behavior is broken down to small steps that lead to achieving the goal.
 - Allocate a specific time for running
 - Run with a group or have someone to be accountable
 - Make running a habit
 - Reinforcement Control: Encourage and reinforce the new behavior.
 - Social interaction, new equipment, clothes, ...
 - Stimulus Control: do things to encourage the desire to run.
 - Put clothes/gear/nutrition out, read running magazines
 - Associative and dissociative strategies: Focusing on running or on something else while running.
 - Figure out what works.
 - Coping thoughts: Learn positive self-talk methods.
 - "I am a runner"

Step Two:

Decide If You Need Medical Clearance

- "...see your doctor before starting any exercise program ..."
- "...see your doctor if YOU DO NOT start an exercise program ..."



Step Two: Decide If You Need Medical Clearance

- ACSM
 - Over 35 years of age: full medical examination including EKG measurements before, during, and after a stress test.
 - Under 35 years of age with certain risk factors for heart disease: same full medical examination.
- Chest pains, dizziness, fainting, hypertensive, family history, ... go see a doc
- Physical Activity Readiness Questionnaire (PAR-Q).

Physical Activity Readiness Questionnaire

Physical Activity Readiness Questionnaire (PAR-Q)

NAME OF PARTICIPANT _____
(last)

PAR Q & YOU

PAR-Q is designed to help you "help yourself" identify health benefits you associated with regular exercise, and completion of PAR-Q is a sensible first step to take if you are planning to increase the amount of physical activity in your life.

For most people, physical activity should not pose any problem or hazard. PAR-Q has been designed to identify the small number of people for whom physical activity might be dangerous or if those who should have medical advice concerning the type of activity most suitable for them.

Complete answer to your most easily by answering these five questions. Please read them carefully and check (x) the "YES" or "NO" appropriate the question if it applies to you.

YES

NO

☐ 1. Has your doctor ever said you have heart trouble?

☐ 2. Do you frequently have pains in your heart or chest?

☐ 3. Do you often feel dizzy or have spells of severe dizziness?

☐ 4. Has a doctor ever said your blood pressure was too high?

☐ 5. Has your doctor ever told you that you have a bone or joint problem such as arthritis that has been aggravated by exercise, or might be made worse with exercise?

☐ 6. Is there a good physical reason not mentioned here why you should not follow an exercise program even if you started?

☐ 7. Are you over the age of 65 and not accustomed to rigorous exercise?

YES to one or more questions

NO to all questions

If you have not recently been in contact with your personal physician for medical advice, please RETURN following your physical activity within 10 days to your personal physician who will determine the amount of physical activity you should pursue.

program

After medical clearance, you should have your physician as to your suitability for "start" and "progress" gradually.

Start with a low level of activity, and gradually increase the level of activity to meet your specific needs, without over-exercising. Check in your community for special programs or services.

postpone

If you have a respiratory virus, such as a common cold.

6

Yes

Answered

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Yes

Answered

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Yes

Answered

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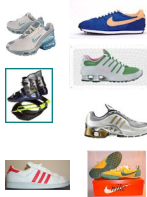
Yes

Answered

6

Step Three: Choose Appropriate Running Shoes

- Covered in more depth in KIN 456/656: Biomechanics of Endurance Performance
- Novice runner:
 - inexpensive pair of running shoes unless injury occurs, then specific shoe for running style.
- Major anatomical features of the shoe
 - Outersole
 - Midsole
 - slip/board lasting
 - heel-counter
 - other devices reducing excessive pronation.



Step Four: Choose Appropriate Clothing

- Keep it simple
 - Dress as lightly as possible ... but appropriate for weather
 - Be comfortable!
 - Shorts and t-shirt
 - Sports bra



Develop a Training Foundation

1. Analyze Motivation and Discipline
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4. Choose Appropriate Clothing
5. Learn the 15 Laws of Training
6. Practical Tips
7. Start with a Planned Training Program
8. Enter Progressively Longer Races
9. Learn From Personal Experience
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12. Decide whether to alternate training volumes weekly
13. View each race as a scientific experiment
14. Beware of the "Selfish Runner's Syndrome"

Step Five: Learn the 15 Laws of Training

- Remember ... runners get injured ... the point of these laws is to increase performance while decreasing the risk of injury.
 - Performance can be thought of as achieving the desired goals (e.g., weight loss, 5K time, completing a marathon)
 - Mere mortals vs. elite athlete
 - Watch out for pitfalls ... excessive training, sticking to schedule, ...
- 1922 to 1935: Englishman Arthur Newton developed the nine initial aspects of training.
- Present: Tim Noakes added six additional laws which are complementary to the nine initial laws of training.

Law One:

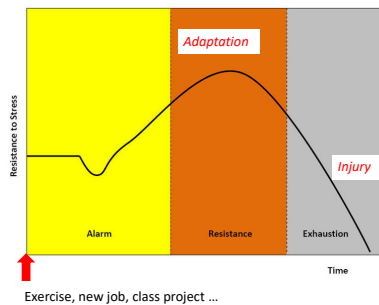
Train Frequently, All-Year Round

- Consistent training
 - Body adapts to stress
- Too much stress leads to injury
 - Reduce stress by cross-training (e.g., DWR, Alter-G, ...)
- Include walking during training for long distances.
 - Run-Walk programs
- Elite level of training cannot be sustained year-round.
 - Rest completely for at least two months per year along with training slowly and consistently for another three months per year.

Hans Hugo Bruno Selye (1907-1982) General Adaptation Syndrome

Classic model of how organisms respond to stress.

The body will adapt to the stress. But if the stress is too much (one time) or applied too long of a time, injury will result.



Hans Hugo Bruno Selye (1907-1982) General Adaptation Syndrome

Alarm:

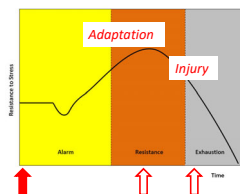
- e.g., 'Fight or Flight'
- Increased HR
- Release of adrenaline

Resistance (Adaptation)

- Repair phase
- Less cortisol released (main 'stress' hormone).
 - Controls mood, motivation, fear
 - Keeps inflammation down
 - Manages fuel use
 - Increases blood glucose
 - Regulates BP
- HR / BP normalize
- Ideally: body learns (adapts) to how to handle the stress.

Exhaustion

- Stress applied too long
- Additional stress applied too frequently
- New stress applied that body has not been adapted to



Law Two:

Start Gradually and Train Gently

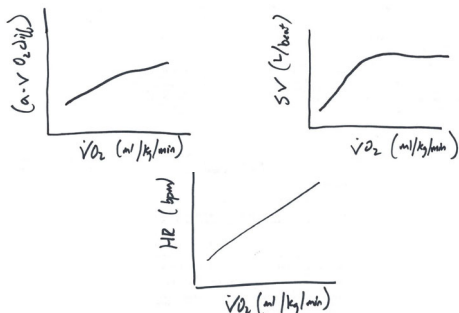
- Injury: Too much change too soon
 - Change in running surface, shoes, volume, intensity, frequency, time
- Novice runners should run longer distances at a comfortable pace.
 - “Long Slow Distance” training.
 - Should be able to perform the “talk test” during long, slow runs.
 - Use Borg’s Scale Rating Perception of Effort (RPE).
 - Use a heart rate monitor.
 - Caution ... may be misleading or used incorrectly.

Borg’s RPE Scale

- 6-20 point scale
 - 20 = max effort
 - Related to HR
 - Especially for 20 year olds
 - 220-age
- | | |
|----|--------------------|
| 6 | no exertion at all |
| 7 | extremely light |
| 8 | |
| 9 | very light |
| 10 | |
| 11 | light |
| 12 | |
| 13 | somewhat hard |
| 14 | |
| 15 | hard (heavy) |
| 16 | |
| 17 | very hard |
| 18 | |
| 19 | extremely hard |
| 20 | maximal exertion |

Fick Equation

$$\dot{V}O_2 = HR \times SV \times (a-v O_2 \text{ diff})$$

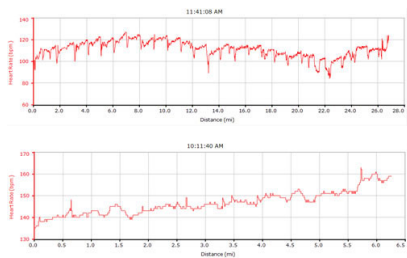


Why measure HR?

- Because it is related to VO_2 .
- Target HR zones are based on 'lactate threshold'
- Need to know max parameters.
- Good advice:
 - Monitor HR during exercise and develop guidelines.



Know your target HR for different distances



Law Three:

Train First for Distance, Only Later for Speed

- This is classic advice and makes sense given Hans Selye model of adaptation.
- However, there may be evidence that high intensity, short duration exercise may be just as beneficial.
- The challenge is matching individual goals, ability, schedule, etc. to develop training program.
- Some training programs focus on time spent training vs. distance covered.

Law Four:

Don't Set Your Daily Training Schedule in Stone

- Family, career, racing ... pick two
- Daily training should act as a guideline.
 - Be flexible about modifying the training plan based on current situation.
- Monitor how legs feel at the beginning of training...if soreness/stiffness gets worse during run, abandon run to allow proper recovery from previous training.
 - 50 vs. 60 min run ... really?
- Get a coach ... someone who can be objective about training.
- Don't try to replicate elite or professional athlete training program ... unless you are elite or professional
 - 20 hours per week?
 - 100 miles per week?

Law Five:

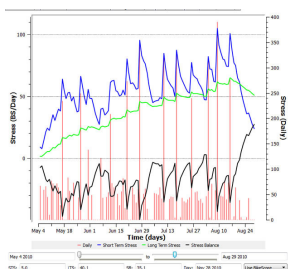
Alternate Hard and Easy Training

- Stress – rest – adaptation
- Bill Bowerman and Bill Dellinger observed that their athletes progressed best when they allowed 24 to 48 hours of recovery after intense training sessions.
- If previous training sessions were strenuous, adequate recovery time must be allowed
 - restock glycogen
 - repair microdamage (e.g., muscle, bone)

Law Six:

Achieve as Much as Possible on a Minimum of Training

- Determining training load is tricky
 - Frequency
 - Intensity
 - Time
 - Mode



Training Volume vs. Race Performance

Optimize training time.

Avoid injury.

Of course, some people just enjoy training ... and performance is not as important.

First victory: Get to the start line injury free.

Second Victory: Get to the finish line.

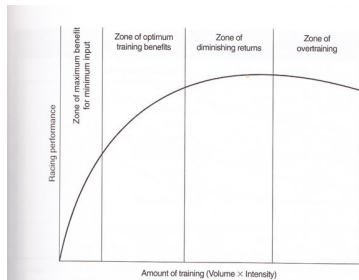


Figure 5.6 Theoretical diagrams showing how to determine your optimal training load. Adapted from C. Foster, Daines, et al. (1996).

Law Seven:

Don't Race When in Training or Run at Race Pace for Distances Above 16 Kilometers

- For marathon runners, six to eight weeks should occur between events.
- Noakes recommends all novice runners to initially avoid time-trials and to focus on building endurance, not speed.²¹
- The shorter the race, the more frequently it can be performed.
- Only two to three races longer than 32-km should be performed per year.

Law Eight: Specialize

- Law of Specificity: To be a good runner, you need to run.
 - To be a successful runner, two to three hours per day need to be set aside for training.
 - Individuals are conditioned only for the sport for which they train.
 - Forms of specialized training include speed training, hot weather training, and altitude acclimatization.
- However ... cross-training, strength training, plyometrics, ... picture not so clear.

Law Nine:

Incorporate Base Training and Sharpening

- This goes back to the idea that training should be year round.
 - Hans Selye adaptation model
- Base Training: consists of long, slow distance running.
- Goal: to run as high a mileage as possible without overtraining and gradually increasing speed and distance with each session.
- Osler suggests that base training should continue for at least six months before starting any sharpening training.

Training Program Overview

Training programs can be sophisticated series of periods.

...or can be simple:
100 runs in 100 days

Match the type of program with goals.

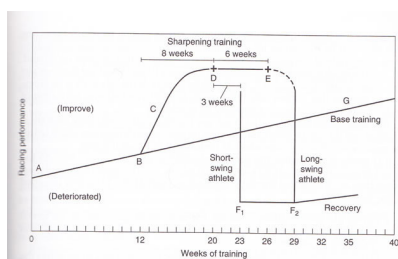
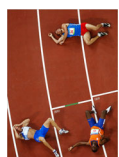
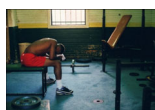


Figure 5.10 The theory behind peaking. Note that the performance of short-swing athletes begins to fall after about 11 weeks of sharpening training whereas that of long-swing athletes may continue to improve for up to 14 weeks of sharpening training.

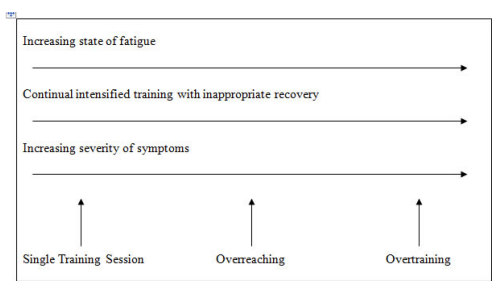
Law Ten: Prevent Overtraining



Law Ten: Prevent Overtraining

- Difficult to quantify
- Overtraining vs. Overreaching
 - Overtraining: “An accumulation of training and/or non-training stress resulting in long-term decrement in performance capacity with or without related physiological and psychological signs and symptoms ...”
 - Restoration of performance may take several weeks or months.
 - Overreaching: short-term decrement in performance.¹
 - Restoration of performance may take several days or weeks

Law Ten: Prevent Overtraining

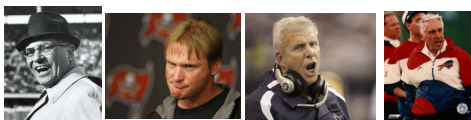


Law Ten: Prevent Overtraining

- If you give a positive answer to three or more of the questions below, you may need to take time to recover:
 - Does your normally comfortable pace leave you breathless?
 - Do your legs feel heavy for longer than usual after a hard workout or race?
 - Do you find it especially hard to climb steps?
 - Do you dread the thought of training?
 - Do you find it hard to get out of bed in the morning?
 - Do you have a persistent lack of appetite?
 - Are you more susceptible to colds, flu, headache, or infections?
 - Is your resting HR 5-10 beats higher than usual?
 - Is your HR during exercise higher than usual?
- Treating Overtraining
 - True overtraining: 6-12 weeks of rest and recovery
 - Overreaching: 1-2 days, possibly 1-2 weeks of rest and recovery

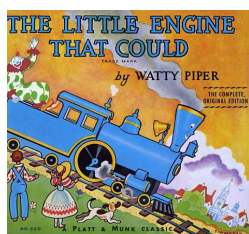
Law Eleven: Train with a Coach

- Coach can provide
 - Knowledge
 - Objectivity
 - Inspiration
 - Accountability



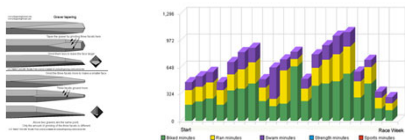
Law Twelve: Train the Mind

- Mental toughness must be developed, cultivated, and cherished.



Law Thirteen: Rest Before a Big Race

- Tapering vs. Detraining
 - Tapering includes rapid reduction in training volume combined with high intensity effort.
 - 2 weeks? 3 weeks?
 - Dependent on current training program, goals, distance of race.



Law Fourteen: Keep a Detailed Logbook

- Serves as a record of results from each day's experiment.
 - Date
 - Mileage / time
 - Notes
 - training route
 - Physiological data (this may be electronic)
 - running partners
 - weather conditions
 - When new shoes were first worn
 - Medications
 - Race reports

Longevity

- Once you have started a program and understand the laws of running, there is still a lot of advice to consider to continue running for a long period of time.



Law Fifteen: Understand the Holism of Training

- Everything affects how you run and train
 - Appropriate diet
 - Amount of sleep
 - Physical effort during the day
 - Work stress



Develop a Training Foundation

1. Analyze Motivation and Discipline
2. Decide If You Need Medical Clearance
3. Choose Appropriate Running Shoes
4. Choose Appropriate Clothing
5. **Learn the 15 Laws of Training**
6. Practical Tips
7. Start with a Planned Training Program
8. Enter Progressively Longer Races
9. Learn From Personal Experience
10. Set realistic training and racing goals
11. Set year-long training goals
12. Decide whether to alternate training volumes weekly
13. View each race as a scientific experiment
14. Beware of the "Selfish Runner's Syndrome"

Step Six: Practical Tips

- There may or may not be scientific evidence of these tips ... they are commonly promoted ... so be careful.
 - Proper breathing
 - Train with company
 - Choose safe and appropriate routes
 - Stretch and strengthen regularly
 - Eat what your body dictates
 - Get enough sleep
 - Be sensible about weather conditions
 - Don't let running become a cause of stress

Step Seven: Start with a Planned Training Program

- Great advice for a beginning runner or someone doing his/her first marathon (or half) is to follow a published training program.
- There seems to be some value to run-walk programs.

Step Eight:**Enter Progressively Longer Races**

- Not all runners want to race or even run distance events. But for those who do, it is good advice to have them slowly increase race distance.
 - Stress-adaptation
 - Practice race day techniques
 - Mass start
 - Aid station logistics
 - Pre-race
 - Nutrition / hydration plan

Step Nine:**Learn From Personal Experience**

- Experiment with different training programs until the program that produces the best results is discovered.
- Undergo a relatively short peaking period of three to five weeks and monitor results.

Step Ten:

Set Realistic Training and Racing Goals

Step Eleven:

Set Year-Long Training Goals

Step Twelve:

Decide Whether to Alternate Training Volumes Weekly

Step Thirteen:

View Each Race as a Scientific Experiment

Step Fourteen:

Beware of the Selfish Runner's Syndrome

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Summary

- The main point of this chapter is to present information on factors to consider when developing a training program.
- Look for the underlying physiology explanation.
- Anecdotal information is important ... but seek out the empirical evidence.
