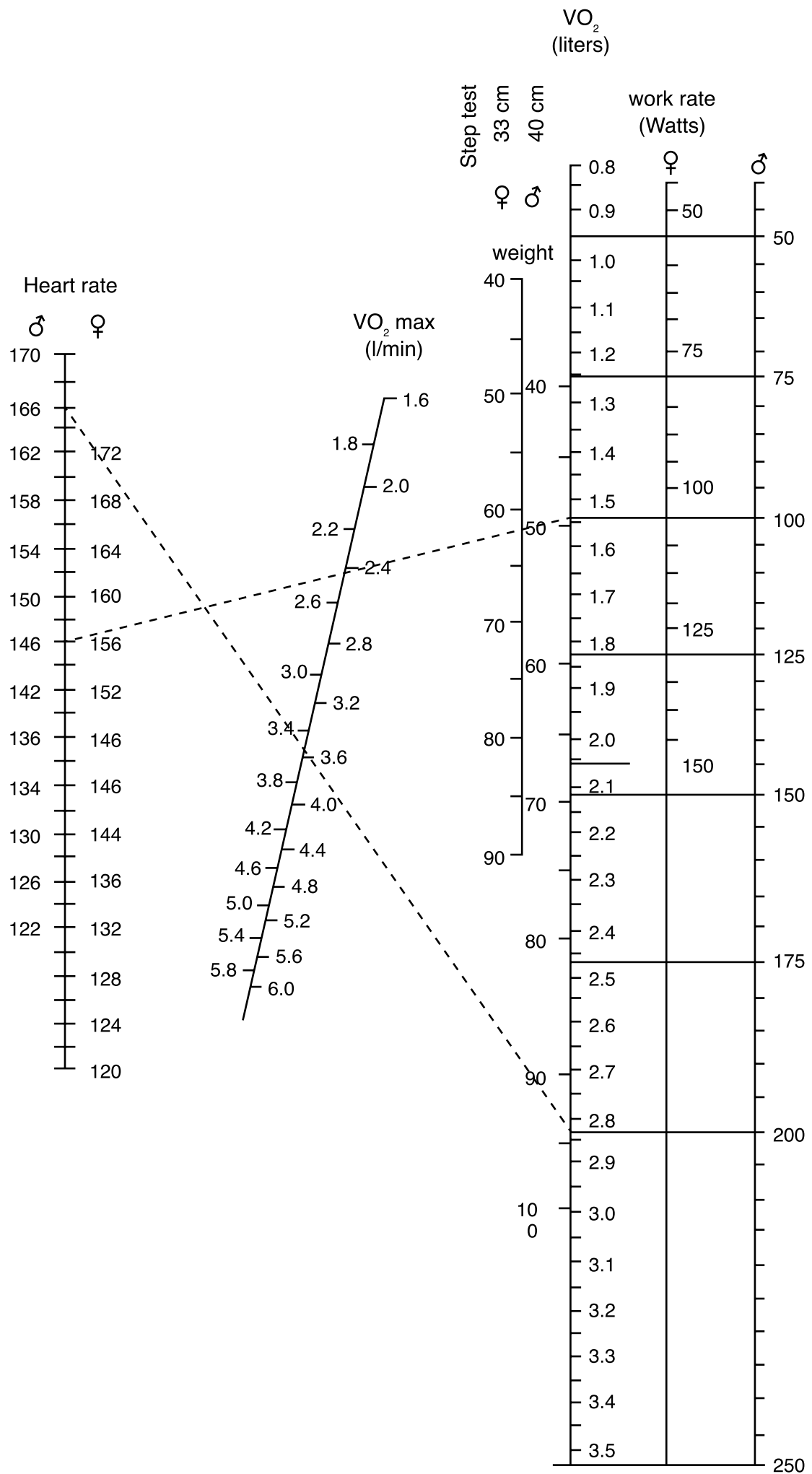


Astrand Rhything Test

Patient information	
Name:	Age:
Height: cm	Weight: kg
Gender: Male Female	Test date:
Equipment	
<ul style="list-style-type: none"> • Body weight scale • Cycle ergometer • Clock or stopwatch 	<ul style="list-style-type: none"> • Heart rate monitor • Score sheet • ECG monitor (optional)
Test procedure	
<ol style="list-style-type: none"> 1. Explain the test procedures, perform health risk screening, obtain informed consent, and record basic information including the patient's weight and resting heart rate. 2. Calibrate the cycle ergometer, attach the heart rate monitor, and allow the subject to warm up for 2-3 minutes at 0 kg resistance with a cadence of 50. 3. Calculate the patient's target heart rate using the Karvonen formula. Start the stopwatch and have the subject begin biking at 100 watts for females and 150 watts for males, recording the heart rate every minute. 4. Adjust the wattage as needed during the first two minutes to reach a steady heart rate close to the target heart rate. Continue recording the heart rate every minute for a total of six minutes, motivating the patient to complete the test. 5. Cool down at a low wattage for 1 minute after the test. Calculate the average heart rate from minutes five and six, and use the nomogram or provided formula to estimate VO₂max, applying the age correction factor. 6. Compare the patient's VO₂max to the normative data tables. 	
Test procedure	
Weight:	Resting heart rate:
kg	bpm

Target heart rate: (using Karvonen formula)	
<i>Karvonen formula: [(max heart rate-resting heart rate)/target percentage of intensity] + resting heart rate</i>	
bpm	
Heart rate recording:	
Minute 1:	bpm
Minute 2:	bpm
Minute 3:	bpm
Minute 4:	bpm
Minute 5:	bpm
Minute 6:	bpm
Additional minute (if needed):	bpm
Steady-state heart rate (HRss) after 6 minutes of exercise:	
bpm	
Workload:	
bpm	
Average heart rate (minutes 5 & 6):	
bpm	
VO₂max estimation:	
Using nomogram:	L/min
Using formula:	
<ul style="list-style-type: none"> Females: $VO_{2max} = (0.00193 \times \text{workload} + 0.326) / (0.769 \times \text{HRss} - 56.1) \times 100$ Males: $VO_{2max} = (0.00212 \times \text{workload} + 0.299) / (0.769 \times \text{HRss} - 48.5) \times 100$ 	
Adjusted VO₂max:	
L/min (VO ₂ max estimation x Correction factor according to age)	

Nomogram



Age correction factor table

Age	Correction factor
15	1.2
16	1.1
17 – 35	1.0
> 35	0.87
> 40	0.83
> 45	0.78
> 50	0.75
> 55	0.71

Normative data

Compare your patient's performance to the tables below:

Female

Age	Very poor	Poor	Fair	Good	Excellent	Superior
13 – 19	< 25.0	25.0-30.9	31.0-34.9	35.0-38.9	39.0-41.9	> 41.9
20 – 29	< 23.6	23.6-28.9	29.0-32.9	33.0-36.9	37.0-41.0	> 41.0
30 – 39	< 22.8	22.8-26.9	27.0-31.4	31.5-35.6	35.7-40.0	> 40.0
40 – 49	< 21.0	21.0-24.4	24.5-28.9	29.0-32.8	32.9-36.9	> 36.9
40 – 49	< 20.2	20.2-22.7	22.8-26.9	27.0-31.4	31.5-35.7	> 35.8
60 +	< 17.5	17.5-20.1	20.2-24.4	24.5-30.2	30.3-31.4	> 31.4

Male

Age	Very poor	Poor	Fair	Good	Excellent	Superior
13 – 19	< 35.0	35.0 – 38.3	38.4 – 45.1	45.2 – 50.9	51.0 – 55.9	> 55.9
20 – 29	< 33.0	33.0 – 36.4	36.5 – 45.4	42.5 – 56.4	46.5 – 54.32	> 54.2
30 – 39	< 31.5	31.5 – 35.4	35.5 – 40.9	41.0 – 44.9	45.0 – 49.4	> 49.4
40 – 49	< 30.2	30.2 – 33.5	33.6 – 38.9	39.0 – 43.7	43.8 – 48.0	> 48.0
40 – 49	< 26.1	26.1 – 30.9	31.0 – 35.7	35.8 – 40.9	41.0 – 45.3	> 45.3
60 +	< 20.5	20.5 – 26.0	26.1 – 32.2	32.3 – 36.4	36.5 – 44.2	> 44.2

Additional notes

Healthcare professional information

Name:

Signature:



Date:

References

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