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https://www.mybib.com/#/projects/vW1MV8/citations	03/04/2026	Create a reference list	No prompt needed
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Comprehensive Health and Fitness Assessment Report

Data Analysis and Interpretation

Cardiovascular endurance is the ability of the heart and lungs to deliver oxygen to working muscles during sustained activity, reflecting aerobic fitness (VO₂ max) (Cheng et al., 2019). The Queen's College Step Test estimates VO₂ max through recovery heart rate after a 3-minute, 88 bpm stepping protocol. Faster recovery indicates better efficiency (Ezzatvar et al., 2021). It is a valid, practical test requiring minimal equipment (Sampaio et al., 2024; Rojas-Navarrete et al., 2022), and strongly predicts health outcomes, with higher fitness linked to lower disease and mortality risk (Lang et al., 2024). Body composition refers to the proportions of fat, muscle, bone, and other tissues, giving more insight than body weight alone (Guan et al., 2025). I measured height (stadiometer) and weight (scales) to calculate BMI, which classifies weight status using $\text{weight} \div \text{height}^2$. BMI is widely used, simple, and practical (Nuttall, 2019). Although it doesn't directly measure body fat, it still helps identify health risks, with higher BMI linked to increased disease and mortality risk (Chooi et al., 2019). Flexibility is described as the ability to move a joint through its full range of motion, reflecting how freely and efficiently the body can move (Afonso et al., 2021). I selected the Sit and Reach Test as it provides a valid measure of range of motion, focusing on the lower back and hamstrings. Poor flexibility in these areas is linked to increased injury risk and reduced performance (Afonso et al., 2021). It also produces measurable results, allowing progress to be tracked and training effectiveness evaluated (Mayorga-Vega et al., 2014). Muscular strength is the maximum force a muscle can produce in a single

effort and supports movement while reducing injury risk (Suchomel et al., 2016). I used the Grip Strength Test, performed with a handgrip dynamometer, with the client standing, elbow at 90 degrees against the body, squeezing maximally for 3 seconds. Three trials were completed per hand, with the best scores combined. It is practical, quick, and non-invasive (Pino-Ortega et al., 2025), and reflects overall strength and health outcomes (Bohannon, 2019; Tomkinson et al., 2024). Muscular endurance is the ability of a muscle group to sustain repeated contractions or maintain effort without fatigue (ScienceDirect, 2024). I used the 1 Minute Sit-Up Test, where the client performs as many sit-ups as possible in one minute with correct technique. This directly measures fatigue resistance. It is a valid and reliable method for assessing trunk endurance (Fallahasady et al., 2022; Klein et al., 2025). Lower endurance is linked to quicker fatigue and reduced performance (Wan et al., 2017).

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Following UWTSD laboratory protocols, the Queen's College Step Test involves a 5-minute warm-up, then 3 minutes of stepping in an "up-up-down-down" rhythm using a metronome (24 steps/min men, 22 women). Recovery heart rate is taken 5 seconds after to estimate VO_2 max and compare to norms. Standardisation of step height, cadence, and timing is essential for reliability (Grgic et al., 2021). Errors may occur from inconsistent pacing or technique, so a metronome, clear instructions, and close monitoring help ensure accurate results. Following guidelines from the American College of Sports Medicine, BMI is assessed using standardised height and weight measurements. Weight is taken with calibrated scales, ensuring zero reading, with the client in light clothing and no shoes. Height is measured using a stadiometer, with proper upright posture. Standardisation is essential, as small inconsistencies such as slouching affect accuracy. A key error is poor posture during height measurement; this is minimised by clear instructions and checking alignment before recording the final result. Following UWTSD lab protocols, the Sit and Reach Test involves a warm-up, then the client sits with legs extended, feet slightly apart, and heels placed at the set mark. Arms are extended forward with hands aligned, reaching along the scale and holding for 1–2 seconds, repeated three times with the best score recorded. Standardisation of warm-up, positioning, and technique ensures reliable results (Tsiakaras et al., 2025). A key source of error was the starting marker being set at 15 cm instead of 23 cm, which could underestimate reach distance. This was minimised by adjusting scores (+8) to maintain validity and comparability. Following UWTSD lab protocols, the Grip Strength Test requires the dynamometer to be adjusted to fit the participant's hand, then held

with the elbow at 90° while squeezing maximally for 3 seconds. This is repeated three times per hand, with rest between trials, and the highest scores are recorded and compared to normative data. Standardising body position, grip size, and technique is essential for reliability. Research shows grip strength is highly reliable when consistent protocols are followed (Shirley Ryan AbilityLab, 2014). Errors are possible from incorrect positioning, minimised through adjustments, clear instructions, and close monitoring. UWTSD lab protocols state that for the 1 Minute Sit-Up Test, the participant lies on their back with knees bent, feet flat, and hands across the chest or at the temples, while the assessor holds their feet for stability. The client then performs as many correct sit-ups as possible in one minute. Keeping instructions, timing, and positioning consistent is important to ensure results are valid and comparable. A potential source of measurement error is inconsistent technique, such as incomplete reps or lifting the hips, which can be minimised through clear guidance and close observation.

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The Queen's College Step Test recorded a recovery heart rate of 169 bpm, estimating a VO_2 max of 34.6 ml/kg/min. Compared to UWTSD norms, this places the client in the "fair" category, indicating moderate cardiovascular fitness. This suggests they can perform moderate-intensity exercise, but not at an optimal level. A strength is their existing aerobic base; however, the high recovery heart rate indicates lower cardiovascular efficiency and slower recovery. This may lead to earlier fatigue during prolonged or intense activity. Overall, the result highlights the need to improve aerobic endurance to enhance fitness, reduce health risks, and improve long-term outcomes. After calculating height and weight, the client's BMI was 35.4, classifying them as Class II obese. This indicates a high level of body fat relative to height and presents a key weakness. A BMI at this level is linked to increased risk of chronic conditions including cardiovascular disease, type 2 diabetes, and hypertension. It may also negatively impact physical performance, as excess weight places greater strain on the cardiovascular system and joints. However, this result provides a clear baseline for intervention, allowing targeted improvements in nutrition and physical activity to enhance body composition, health, and overall fitness. In the Sit and Reach Test, the client initially recorded 19 cm; however, as the box was set at 15 cm instead of the required 23 cm, +8 cm was added, giving a corrected score of 27 cm. This places them around the 30th percentile, indicating below-average flexibility. This suggests a weakness in the hamstrings and lower back, with a limited range of motion that may reduce movement efficiency and increase injury risk. It can also impact posture and functional movement (Afonso et al., 2021). However, a basic level of flexibility is

present, providing a good starting point for improvement. In the Grip Strength Test, after completing three trials on each hand, the highest score from each hand was recorded, added together, and divided by body weight to give the final grip strength value. The client scored 67.9 kg, placing them in the 90th percentile, indicating a very high level of muscular strength. This suggests strong force production, particularly in the hands and forearms. Grip strength is closely linked to overall muscle strength and physical function, and is associated with better health outcomes and lower mortality risk (Bohannon, 2019), although it does not assess all muscle groups. In the 1 Minute Sit-Up Test, the client completed 27 sit-ups, placing them in the below-average category for their age and highlighting a weakness in muscular endurance, particularly in the core. This may affect functional activities and exercise performance, as lower endurance can lead to earlier fatigue and difficulty maintaining posture over time. Core endurance is essential for stability and spinal support, with lower levels linked to dysfunction and a higher risk of lower back pain (Abdelraouf, 2016). However, as the client is close to average, this provides a solid foundation for improvement through targeted core training.

Recommendations

To improve body composition, the client should aim to create a calorie deficit by increasing physical activity and adopting a more balanced, nutritious diet. Research shows that combining diet and exercise is most effective for reducing body fat and improving health (Swift et al., 2018). To address their lower flexibility, they should include static stretching 2–3 times per week, focusing on the hamstrings and lower back (Afonso et al., 2021). As muscular strength is a clear strength, this should be maintained through regular resistance training (Westcott, 2012), while core exercises such as planks and sit-ups will help improve muscular endurance. Increasing overall activity levels and staying consistent will support long-term health (Bull et al., 2020).

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