Aerobic Exercise for People with Diabetes with Active Diabetic Foot Ulceration

	Prescription Component	Aerobic
F	Frequency 	• Same as guidelines for adults with one modification: no more than 2 days in a row without exercise. (3-7 days/week)
I	Intensity 	• Moderate (40-59% HRR; RPE 11-12) to vigorous (60-89% HRR or RPE 14-17) • Do note if medications affect HR. If HR affected, use RPE.
T	Time 	• 30 – 60 minutes/day of moderate exercise or 20-60 minutes/day of vigorous exercise is recommended for the general population. • However, any amount can be beneficial so bouts may start shorter, even less than 10 minutes.
T	Type 	• Cycling; rowing; seated marching; UBE; seated exercise program • Consideration for circuits for resistance training to assist with aerobic training **Consideration must be made for compromised skin on the plantar surface of the foot and all at risk skin. **Cycling, rowing, and UBE would need to be used with caution because some weight may be born on the feet which may lack sensation.
V	Volume 	• 150-300 minutes/week of moderate activity OR • 75-150 minutes of vigorous activity OR • Some combination of both
P	Progression 	• Can progress frequency, intensity, time (volume). • Progression will depend on individual goal and baseline level of fitness
Why?	Reasoning 	• The effect of exercise on the action of insulin is transient. • Making a goal for more activity is even better. • If able to tolerate vigorous exercise, this type of training generally has more profound effects on disease management.
Benefits[1-3]		• Improves glycemic control • Lowers blood pressure • Lowers A1C • Improves lipid profile • Improves physical function • Decreases depression • Improves quality of life

Modified from Table 2 Kanaley JA, et al. 2022[1] and consistent with Standards of Medicine in Diabetes.[2] HR: Heart rate; HRR: Heart rate reserve; NWB: Non-weight-bearing; RM: repetition maximum; ROM: Range of motion; RPE: rating of perceived exertion (Borg 6-20 scale)

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General Considerations:

Before performing resistance training:

1. Check blood glucose
2. Check blood pressure
3. Consider orthopedic limitations

Following exercise:

1. Check blood glucose
2. Check blood pressure
3. Remind patient to avoid more than 2 days in a row without exercise

Example Exercise Prescription Related to Non-weight bearing Aerobic Exercise:

Seating rowing or stationary ergometry (**type**) for 15 minutes per bout (**time**) x 2 times per day, 5 days per week (**frequency**). Rate of perceived exertion of 11-12 or 14-17 on the 6 to 20 Borg RPE scale (**intensity**). The **volume** of this exercise would be 30 minutes per day x 5 days equaling 150 min of moderate to vigorous aerobic exercise per week. This activity could be progressed by increasing time per bout (e.g., 20 minutes) OR frequency of bouts (e.g., 3 times per day or 6 days per week) OR intensity of bouts (e.g., moving from moderate (11-12 RPE) to vigorous (14-17 RPE)) (**progression**).

Optimal Dosage:

According to Gallardo-Gomez D, et al.,[3] 1100 MET*min/week was the optimal dose for glycemic control in people with type 2 diabetes.

Example for Calculating MET*min/week:

If rowing or stationary ergometry takes approximately 5 METs with moderate effort,[4] then each 15-minute bout would be 75 MET*min. Doing 2 per day over 5 days would be equal to 750 MET*min/week. [Bout = 5METs x 15 minutes = 75 MET*min; per day = 75 MET*min * 2 = 150 MET*min/day; per week = 150 MET*min/day x 5 days/week = 750 MET*min/week.

This is below optimal dosage but another activity could be added to increase the total number of MET*min/week.

References:

1. Kanaley JA, Colberg SR, Corcoran MH, Malin SK, Rodriguez NR, et al. Exercise/physical activity in individuals with type 2 diabetes: a consensus statement from the American College of Sports Medicine. *Med Sci Sports Exerc*. 2022;54(2):353-363.
2. American Diabetes Association Professional Practice Committee. 5. Facilitating positive health behaviors and well-being to improve health outcomes: standards of care in diabetes—2025. *Diabetes Care*. 2025;48(Suppl. 1):S86-S127.
3. Gallardo-Gomez D, Salazar-Martinez E, Alfonso-Rosa RM, et al. Optimal dose and type of physical activity to improve glycemic control in people diagnosed with type 2 diabetes: a systematic review and meta-analysis. *Diabetes Care*. 2024;47:295-303.
4. Compendium of physical activities: quantifying physical activity energy expenditure. https://pacompendium.com/adult-compendium/ accessed 6.23.2025.