

The Artificial Pancreas (AP) improves glycemic control during extended exercise at Ski Camp in adolescents with Type 1 Diabetes (T1D)

Gregory P. Forlenza, MD¹; Daniel R. Cherňavsky, MD²; Mark DeBoer, MD²; Jessica Robic, BS, CRC²; Boris P. Kovatchev, PhD²; R. Paul Wadwa, MD¹; Laurel Messer, RN, CDE, MPH¹; David M. Maahs, MD, PhD¹; Marc D. Breton, PhD²



¹ Barbara Davis Center for Childhood Diabetes, University of Colorado Denver, Denver CO; ² Center for Diabetes Technology, University Of Virginia, Charlottesville, VA

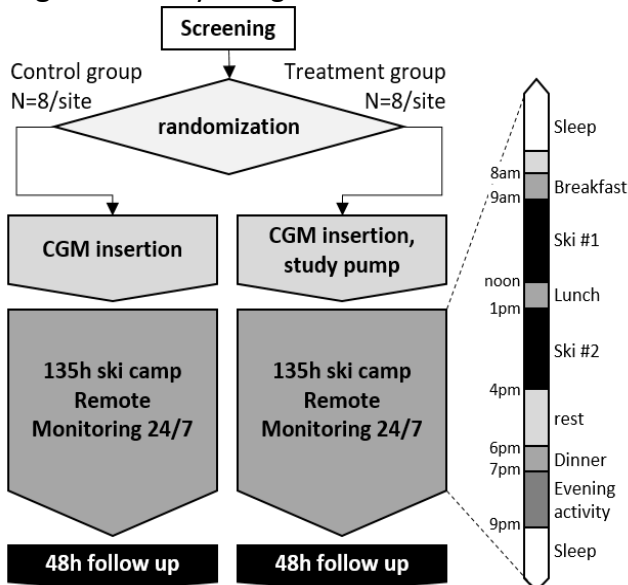
Background

- Intense exercise often leads to abnormal glucose control in patients with T1D.
- Adjusting management for exercise remains one of the major burdens of T1D therapy.
- AP systems can improve glycemic control during and after exercise, but exercise studies have been limited.
- Skiing camps present a unique mix of prolonged physical activities of varied intensities, with metabolic effects compounded by cold, altitude, and stress/fear/excitement.

Results

- Percent time between 70-180mg/dL was significantly better in the AP group than in the SAP group (71% vs 65%; p=0.005) overall with maximum effect in the second half of the night.
- Percent time < 70 mg/dL was significantly reduced overall when adjusted for skiing skill level (3.2% vs 1.8%; p=0.002).
- Post-study qualitative feedback was highly positive regarding the AP system and study experience.

Figure 1. Study Design



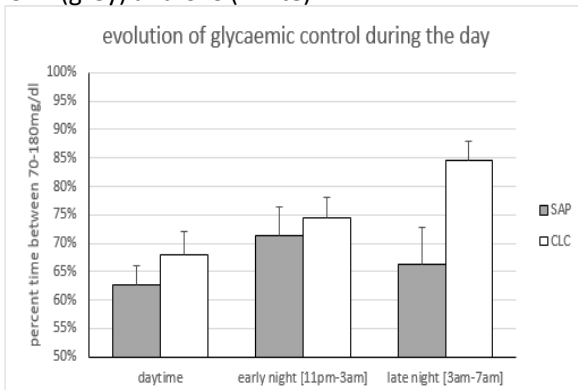
Conclusions

- During the first winter-sport AP camp, we report significantly improved glycemic control without any device-related adverse events and with overwhelmingly positive patient feedback.

Methods

- In a randomized controlled clinical trial, 32 adolescents with T1D (ages 10-16; 17 males) participated in a 5-day ski camp (~5h skiing/day), with N=16 fitted with the UVA AP system (vs. sensor augmented pump), at two sites: Wintergreen VA and Breckenridge CO.
- Control and treatment groups were matched by age and HbA1c; ski/snowboard proficiency was balanced overall but with a strong site effect.
- All subjects were physician monitored 24h/day using the UVA Diabetes Web Monitoring (DWM) system, allowing for strict enforcement of safety protocols on and off the slopes.

Figure 2. Glycemic control as represented by percent time in desirable zone (70mg/dl-180mg/dl) during different time of day for both SAP (grey) and CLC (white)



Acknowledgements: Riding on Insulin, TypeZero Technologies, Children's Diabetes Foundation, UC Foundation, Roche, Tandem, Dexcom, NIH (NIDDK DP3DK106826)