

## Bilateral Pole Walking Effects Evidence Table Young Adult

Author/Year Title Journal/Country	Study Design & Purpose	Participants	Intervention	Measures	Results	Conclusions	Relevance
<b>Saunders et al (2008)</b> <i>Trekking poles increase Physiological Responses to Hiking Without Increased Perceived Exertion (USA)</i>	Cross-sectional Compare physiological & subjective effects of mod hiking w/&w/o poles	n=15 22.1±2.1 yrs healthy, male novice hikers	4 trials on mod 1.25 km hiking trails, 2 w/ poles, 2 w/o poles @ self-selected pace	Portable metabolic unit & HR monitor for VO <sub>2</sub> , VE & HR RPE	Significant ↑ (p<0.05) in VO <sub>2</sub> , VE & HR & ↓ in RPE in PW trials compared w/ W trials	Use of poles may ↑calorie expenditure w/ less PRE for low-mod intensity hikes on mod grade trails	PW an effective aerobic activity w/ less RPE on easy/moderate trails
<b>Foissac et al (2008)</b> <i>Effects of Hiking Pole Inertia and Muscular Costs During Uphill Walking (France)</i>	Cross-sectional Study of effects of uphill PW	n=11 24.0±4.6yrs healthy, male	14 4-min trials on treadmill w/ 20% incline @ fixed speed w/ & w/o poles w/ varying pole freq	VO <sub>2</sub> ,VCO <sub>2</sub> , RER UE/LE EMG ( 9 mm)	PW ↑UE mm act 95% & ↓LE mm act 15% @ lower/preferred freq	1)Pole use when walking uphill does not ↑energy costs. 2) Low freq PW redistributes mm recruitment, 3) hi freq PW uphill inefficient	Pole technique modifications may improve effectiveness for uphill walking
<b>Schwameder et al (1999)</b> <i>Knee joint forces during downhill walking with hiking poles (Austria)</i>	Cross-sectional Compare knee jt loads w/&w/o HP in downhill walking	n=8 26.6±3.8yrs healthy, male	Two trials of walking down -25° grade ramp (steep) w/& w/o HP	GRF, knee flexion moment, tibiofemoral compressive & shear forces	With HP, all variables ↓during single & double support phase & SS during single support phase btw 10-16%	HP technique may help to reduce knee joint loading in downhill walking.	PW technique on downhill may need adjustment to improve single stance support.
<b>Jacobson et al (1999)</b> <i>Load Carriage Energy Expenditure With and Without Hiking Poles During Inclined Walking (USA)</i>	Cross-sectional Compare load carriage expenditure w/ & w/o HP	n=20 29.7 ± 3.7 yrs healthy, male	6 15-min inclined treadmill trials over 2 wks wearing load carriage of 15 kg, w/ & w/o HP	HR, VO <sub>2</sub> , VE, RPE	Mean RPE significantly lower (p<0.05) w/ use of HP	HP may decrease RPE when carrying load on mod uphill grade w/o increasing energy expenditure.	PW may help to carry load w/ less RPE - implications for individuals w/ obesity?
<b>Pérez-Soriano et al (2011)</b> <i>Nordic Walking Practice Might Improve Plantar Pressure Distribution (Spain)</i>	Cross-sectional Investigate PW suitability for individuals w/ frail feet	n=50 25 M, 25 F mean age 25.9 yrs 20 beg NW & 30 experienced NW	W & NW trials on 12m long walkway @ preferred speed and faster speed.	9 foot zones measured for plantar pressure @ preferred and 20% faster walking speed	Experienced NW had SS (p<0.05) pressure reduction of 35-50% in central metatarsal (CM) area; beginning NW showed SS 20-30% reduction in CM zone	NW intervention may be beneficial for individuals w/ frail feet, including obesity, diabetic neuropathy, to reduce or learn to reduce plantar pressure to CM area.	Use of PW may help improve plantar pressure distribution in walking activities.