

Supplementary File 5. Overview of findings using force-entry modelling.

The logistic regression models for predicting a 2% KAM impulse reduction with WEDG and WEDG+V-ARCH insole conditions were significant ($p < 0.05$) using forced-entry of clinically-accessible and laboratory-derived pools of predictor variables. Model statistics and odds ratios for predictor variables at the 2% response threshold are summarized in below in Supplementary File 5a. At the 6% (Supplementary File 5b) and 10% (Supplementary File 5c) response thresholds, no models were significant for WEDG ($p > 0.134$), and only the laboratory-derived model at 6% was significant for WEDG+V-ARCH. Both models were significant for WEDG+V-ARCH at 10%, though sex was excluded from the final model due to a lack of model convergence.

For the WEDG condition at the 2% response threshold, clinically-accessible and laboratory-derived gait speed was a significant predictor such that a faster gait speed was related to a greater likelihood of reducing the KAM impulse. NRS pain was the only other significant predictor in the clinically-accessible model for WEDG, such that higher knee pain was related to a greater likelihood of KAM impulse reduction. Predictor variables of interest ($p < 0.10$) potentially linked to a greater likelihood of KAM impulse reduction included older age for the clinically-accessible model, and higher NRS pain and lower FFI pain for the laboratory-derived model.

For the WEDG+V-ARCH condition at the 2% response threshold, significant predictor variables for clinically-accessible and laboratory-derived models included gait speed and sex. Having faster gait speed and female sex were related to an increased likelihood of reducing the KAM impulse with WEDG+V-ARCH. NRS pain was also a significant predictor for the clinically-accessible model, such that higher knee pain was related to greater likelihood of KAM

impulse reduction with this insole. Predictor variables of interest ($p < 0.10$) potentially linked to a greater likelihood of KAM impulse reduction included lower FFI pain for both clinically-accessible and laboratory-derived models, and increased NRS pain for the laboratory-derived model only.

In other significant models at 6% and 10% KAM reduction thresholds, faster gait speeds and female sex were generally seen to be predictive of KAM response when wearing WEDG+V-ARCH.

Supplementary File 5a. Forced-entry logistic regression model statistics for 2% response threshold. Bolded odds ratio values and p-values indicate statistical significance ($\alpha = 0.05$).

	WEDG		WEDG+V-ARCH		
	Clinically-Accessible	Laboratory Derived	Clinically-Accessible	Laboratory Derived	
Responder : Non-Responder	33:20	33:20	28:25	28:25	
Model AIC	65.652	68.375	73.601	75.379	
Model Likelihood Ratio (p-value)	<i>p</i> 0.003	0.007	0.014	0.025	
H&L Goodness of Fit (p-value)	<i>p</i> 0.670	0.550	0.199	0.571	
AUC ROC (c)	<i>c</i> 0.874	0.880	0.861	0.847	
	95%CI (0.780, 0.968)	(0.789, 0.972)	(0.762, 0.961)	(0.738, 0.957)	
Odds Ratios by Predictor Variable					
Age	OR	1.141	1.072	1.074	1.048
	95%CI	(0.978, 1.331)	(0.936, 1.226)	(0.945, 1.222)	(0.934, 1.176)
	<i>p</i>	0.093	0.316	0.275	0.429
Sex	OR	1.041	0.716	0.148	0.121
	95%CI	(0.158, 6.858)	(0.091, 5.656)	(0.023, 0.961)	(0.015, 0.970)
	<i>p</i>	0.966	0.751	0.045	0.047
BMI	OR	0.958	0.960	0.985	1.004
	95%CI	(0.755, 1.214)	(0.763, 1.207)	(0.792, 1.225)	(0.809, 1.247)
	<i>p</i>	0.721	0.724	0.892	0.968
FPI	OR	0.948	0.896	0.995	0.941
	95%CI	(0.751, 1.196)	(0.720, 1.116)	(0.807, 1.227)	(0.772, 1.148)
	<i>p</i>	0.652	0.328	0.964	0.551
NRS pain	OR	2.256	1.692	1.984	1.538
	95%CI	(1.041, 4.891)	(0.943, 3.036)	(1.070, 3.681)	(0.939, 2.520)
	<i>p</i>	0.039	0.078	0.030	0.087
FFI pain	OR	0.950	0.949	0.950	0.955
	95%CI	(0.890, 1.013)	(0.896, 1.006)	(0.899, 1.004)	(0.906, 1.008)
	<i>p</i>	0.118	0.080	0.069	0.093
KL grade	OR	0.423	0.319	0.812	0.576
	95%CI	(0.073, 2.462)	(0.052, 1.961)	(0.170, 3.870)	(0.124, 2.667)
	<i>p</i>	0.339	0.218	0.794	0.480
Gait speed	OR	4.060	3.001	2.710	2.288
	95%CI	(1.551, 10.628)	(1.466, 6.144)	(1.329, 5.524)	(1.271, 4.117)
	<i>p</i>	0.004	0.003	0.006	0.006
Knee alignment	OR	1.279	1.035	1.190	1.032
	95%CI	(0.939, 1.742)	(0.846, 1.267)	(0.904, 1.566)	(0.873, 1.220)
	<i>p</i>	0.118	0.737	0.215	0.711

Ankle/subtalar joint eversion	OR	0.899	1.018	0.876	1.101
	95%CI	(0.703, 1.150)	(0.735, 1.410)	(0.704, 1.090)	(0.818, 1.481)
	<i>p</i>	<i>0.397</i>	<i>0.913</i>	<i>0.234</i>	<i>0.526</i>
Foot progression angle	OR	0.875	0.922	0.909	1.006
	95%CI	(0.732, 1.047)	(0.802, 1.059)	(0.779, 1.060)	(0.888, 1.139)
	<i>p</i>	<i>0.145</i>	<i>0.250</i>	<i>0.223</i>	<i>0.924</i>

Abbreviations: AIC = Akaike information criterion, AUC = area under curve, BMI = body mass index, FFI = foot function index, FPI = foot posture index, H&L = Hosmer & Lemeshow, KL = Kellgren & Lawrence, OR = odds ratio, ROC = receiver operating characteristic.

Supplementary File 5b. Forced-entry logistic regression model statistics for 6% response threshold. Bolded odds ratio values and p-values indicate statistical significance ($\alpha = 0.05$). Only significant models ($p < 0.05$) with appropriate goodness of fit ($p > 0.05$) are included.

	WEDG		WEDG+V-ARCH	
	Clinically-Accessible	Laboratory Derived	Clinically-Accessible	Laboratory Derived
Responder : Non-Responder	22:31	22:31	20:33	20:33
Model AIC	79.748	81.448	69.435	68.894
Model Likelihood Ratio (p-value)	<i>p</i>	<i>0.134</i>	0.010	0.008
H&L Goodness of Fit (p-value)	<i>p</i>	<i>0.668</i>	0.013	<i>0.608</i>
AUC ROC (c)	<i>c</i>	0.804	0.882	0.880
	95%CI	(0.687, 0.920)	(0.776, 0.988)	(0.780, 0.980)

Odds Ratios by Predictor Variable

Age	OR			1.052
	95%CI	-	-	(0.921, 1.200)
	<i>p</i>			<i>0.456</i>
Sex	OR			0.072
	95%CI	-	-	(0.007, 0.736)
	<i>p</i>			0.027
BMI	OR			0.973
	95%CI	-	-	(0.767, 1.234)
	<i>p</i>			<i>0.821</i>
FPI	OR			1.040
	95%CI	-	-	(0.842, 1.284)
	<i>p</i>			<i>0.716</i>
NRS pain	OR			1.229
	95%CI	-	-	(0.733, 2.062)
	<i>p</i>			<i>0.434</i>
FFI pain	OR			1.010
	95%CI	-	-	(0.951, 1.071)
	<i>p</i>			<i>0.753</i>
KL grade	OR			0.230
	95%CI	-	-	(0.040, 1.312)
	<i>p</i>			<i>0.098</i>
Gait speed	OR			2.146
	95%CI	-	-	(1.210, 3.805)
	<i>p</i>			0.009
Knee alignment	OR			1.102
	95%CI	-	-	(0.915, 1.328)

					<i>p</i>	<i>0.306</i>
Ankle/subtalar joint eversion	OR					1.246
	95%CI	-	-	-		(0.885, 1.754)
					<i>p</i>	<i>0.208</i>
Foot progression angle	OR					1.037
	95%CI	-	-	-		(0.914, 1.176)
					<i>p</i>	<i>0.575</i>

Abbreviations: AIC = Akaike information criterion, AUC = area under curve, BMI = body mass index, FFI = foot function index, FPI = foot posture index, H&L = Hosmer & Lemeshow, KL = Kellgren & Lawrence, OR = odds ratio, ROC = receiver operating characteristic

Supplementary File 5c. Forced-entry logistic regression model statistics for 10% response threshold. Bolded odds ratio values and p-values indicate statistical significance ($\alpha = 0.05$). Only significant models ($p < 0.05$) with appropriate goodness of fit ($p > 0.05$) are included.

	WEDG		WEDG+V-ARCH	
	Clinically-Accessible	Laboratory Derived	Clinically-Accessible	Laboratory Derived *
Responder : Non-Responder	16:37	16:37	12:41	12:41
Model AIC	75.340	77.550	45.780	47.011
Model Likelihood Ratio (p-value)	<i>p</i> 0.257	0.413	<0.001	<0.001
H&L Goodness of Fit (p-value)	<i>p</i> 0.923	0.678	0.822	0.388
AUC ROC (c)	c 0.812	0.770	0.968	0.949
	95%CI (0.670, 0.927)	(0.631, 0.909)	(0.923, 1.000)	(0.895, 1.000)

Odds Ratios by Predictor Variable

Age	OR			1.217	1.141
	95%CI	-	-	(0.938, 1.578)	(0.934, 1.394)
	<i>p</i>			0.140	0.197
Sex	OR			0.011	
	95%CI	-	-	(<0.001, 6.149)	-
	<i>p</i>			0.162	
BMI	OR			0.658	0.838
	95%CI	-	-	(0.306, 1.417)	(0.581, 1.209)
	<i>p</i>			0.286	0.345
FPI	OR			0.708	0.854
	95%CI	-	-	(0.385, 1.303)	(0.629, 1.159)
	<i>p</i>			0.267	0.310
NRS pain	OR			0.778	0.774
	95%CI	-	-	(0.347, 1.742)	(0.366, 1.637)
	<i>p</i>			0.541	0.503
FFI pain	OR			1.006	1.020
	95%CI	-	-	(0.856, 1.182)	(0.918, 1.133)
	<i>p</i>			0.945	0.711
KL grade	OR			0.106	0.081
	95%CI	-	-	(0.002, 4.711)	(0.005, 1.421)
	<i>p</i>			0.246	0.086
Gait speed	OR			1.797	2.286
	95%CI	-	-	(0.690, 4.679)	(1.077, 4.853)
	<i>p</i>			0.230	0.031
Knee alignment	OR			2.388	1.479
	95%CI	-	-	(1.041, 5.478)	(1.036, 2.112)

		<i>p</i>		0.040	0.031
Ankle/subtalar joint eversion	OR			1.274	1.037
	95%CI	-	-	(0.724, 2.242)	(0.620, 1.735)
		<i>p</i>		0.401	0.890
Foot progression angle	OR			1.081	0.937
	95%CI	-	-	(0.838, 1.395)	(0.752, 1.167)
		<i>p</i>		0.547	0.559

* Indicates the Laboratory-Derived model for WEDG+V-ARCH used a pool of forced-entry predictor variables that excluded sex. The model which included sex was not reported because it did not converge statistically.

Abbreviations: AIC = Akaike information criterion, AUC = area under curve, BMI = body mass index, FFI = foot function index, FPI = foot posture index, H&L = Hosmer & Lemeshow, KL = Kellgren & Lawrence, OR = odds ratio, ROC = receiver operating characteristic