

Purpose: To examine whether there is a change in kinematics in relation to the type of shoe: maximalist or traditional an individual wears when running

Group Members: Abigail Salazar, Angelica Capito, Carrie Olson, Nancy Sarabia

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Jomar Reyes

San Jose State University

Dr. Sharveen Riazati

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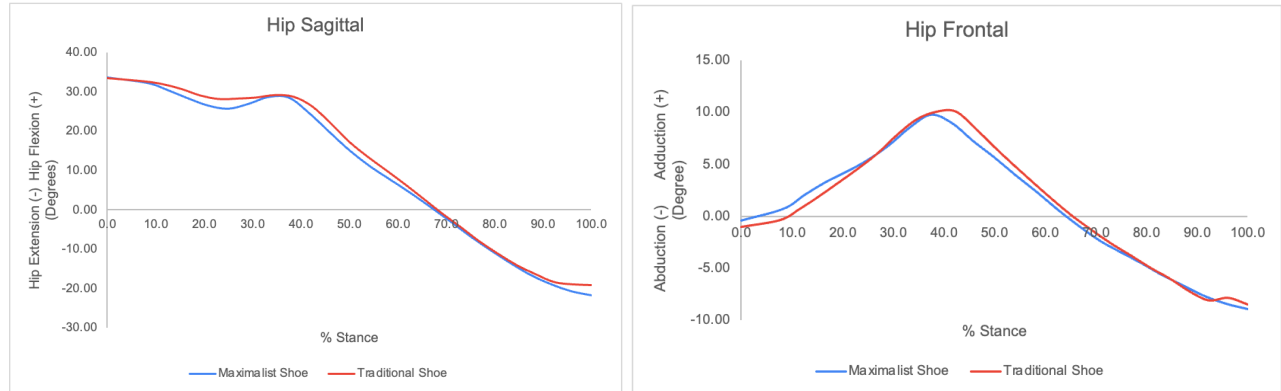


Table 1. Table representing mean values in degrees for hip sagittal and frontal plane kinematics for maximalist vs. traditional shoes.

	Hip Sagittal		Hip Frontal	
	Maximalist	Traditional	Maximalist	Traditional
Variables (Degrees)				
IC	33.75	33.74	-0.42	-1.03
MS	15.24	15.24	5.65	6.66
TO	-21.68	-19.04	-8.84	-8.50
Max	33.75	33.54	9.77	10.10
RoM	55.43	52.58	18.71	18.60

Initial Contact (IC); Mid Stance (MS); Toe-off (TO) Peak angle (Max); Range of Motion (RoM)

Hip sagittal negative angles denotes extension

Hip frontal negative angles denotes abduction

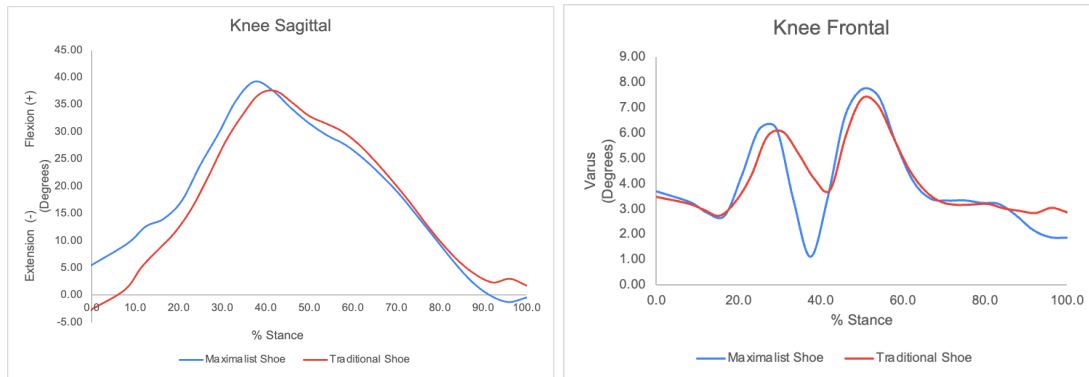


Table 2. Table representing mean values in degrees for knee sagittal and frontal plane kinematics for maximalist vs. traditional shoes.

	Knee Sagittal		Knee Frontal	
	Maximalist	Traditional	Maximalist	Traditional
Variables (Degrees)				
IC	5.51	-2.62	3.70	3.48
MS	31.58	32.92	7.73	7.35
TO	-0.41	1.78	1.88	2.87
Max	39.22	37.49	7.73	7.35
RoM	40.46	40.11	6.61	4.61

Initial Contact (IC); Mid Stance (MS); Toe-off (TO) Peak angle (Max); Range of Motion (RoM)

Knee sagittal negative angles denotes extension

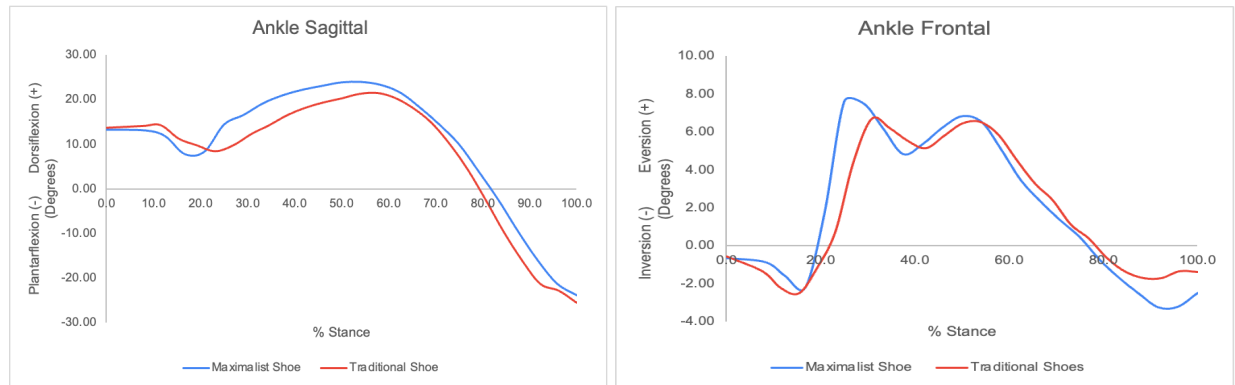


Table 3. Table representing mean values in degrees for ankle sagittal and frontal plane kinematics for maximalist vs. traditional shoes.

	Ankle Sagittal		Ankle Frontal	
	Maximalist	Traditional	Maximalist	Traditional
Variables (Degrees)				
IC	13.26	13.67	-0.65	-0.56
MS	23.90	20.23	6.82	6.43
TO	-23.92	-25.46	-2.48	-1.38
Max	24.00	21.45	7.60	6.67
RoM	47.91	46.91	10.83	9.18

Initial Contact (IC); Mid Stance (MS); Toe-off (TO) Peak angle (Max); Range of Motion (RoM)

Ankle sagittal negative angles denotes plantarflexion

Ankle frontal negative angles denotes inversion

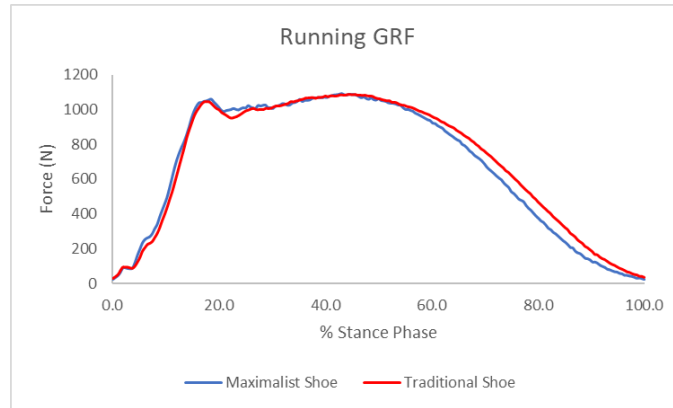


Table 4. Table representing vertical ground reaction force variables for maximalist vs. traditional shoes.

Variables (Body Weight)	Running GRF	
	Maximalist	Traditional
Impact Peak	2.12	2.10
Active Peak	2.18	2.18
Loading Rate*	57.3	75.7

*Body Weight/ second (BW/s)

Discussion

We observed the change in kinematics in relation to the type of shoe: maximalist or traditional an individual wears when running. The peak knee frontal values of the participants for maximalist shoe (MS) is 7.73° compared to traditional shoe (TS) 7.35° . The higher value of knee varus correlates to an increased risk of injury for individuals running (Jafarnezhadgero et al., 2017). Untreated excessive knee varus may cause a deterioration of the knee joint due to the overloading and excessive cartilage use in the medial side of the knee. (Jafarnezhadgero et al., 2017). In this case, since the value of TS is lower there is a lower risk of injury and the MS did not reduce this risk at all.

The participant's peak ankle eversion for maximalist shoe (MS) is 7.60° compared to the 6.67° for traditional shoe (TS). Ankle eversion occurs during heel strike and is a way our foot absorbs the impact during heel strike (Tsujimoto, 2017). Although both values are within normal range for running of under 13° , a higher value of ankle eversion when running may cause more stress on the foot creating a risk factor for plantar fasciitis, Achilles tendinitis, or even patellar tendonitis (Tsujimoto, 2017).

The loading rate for TS is 57.3 BW/s and higher compared to MS at 75.7 BW/s (See Table 4). A higher loading rate correlates to a higher risk of injury (Chan, 2018). Furthermore a faster collision occurs during a higher loading rate whereas a lower loading rate allows for the forces to be more spread out, resulting in a lower risk of injury (Chan, 2018).

MS has been proven to reduce risk of injury for an individual's knee joint and provides a lower loading rate in running (Marchena-Rodriguez et al., 2020). Traditional running shoes are made to reduce running-related injuries compared to flat-bottom no cushion shoes (Marchena-Rodriguez et al., 2020). Maximal footwear are shoes that provide "...extra cushioning of the entire midsole, from rearfoot to forefoot, but without any increase in the drop" (Marchena-Rodriguez et al., 2020).

There is not enough research to prove that MS provides greater benefits than TS instead it is all up to personal preference, comfortability, and affordability.

Works Cited

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