Lower limb Kinematic analysis to Le Petit Echappe´ by using two differentPointe Training Pointe and Professional Pointe in ballet

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1/0 Introduction:

Biomechanics is considered one of the highest and noblest of sciences, (Lee et al., 2012). This science seeks to study the characteristic curve of mathematical skills in particular (Aquino et al., 2019; Jarvis & Kulig, 2020), as dynamic motor performance requires Many special skills and each skill includes a set of performances. The most effective way to improve and develop performance is kinematic analysis, as it requires determining the correct mechanical performance of the skill. (McGinnis, 2011; Payton & Bartlett, n.d., 2018) (Pitkin, n.d.)

Ballet is considered a global language and is defined as a theatrical performance in which group and individual dance and movement expression participate with musical or lyrical accompaniment, or with percussion instruments, and by using appropriate clothing, scenes and lighting.

As it is considered an integrated art that performs certain movements in a specific place, and the ballet presentation is the fruit of engineering thinking in a spatial space, and the machine that he uses is the body of the dancer himself, and his preservation of balance so that he can be stable in any special position or during movement. (Lin et al., 2005; saleh & ahmed al sabw, 2020a; hany abdelaziz ibrahim Saleh & ahmed al sabw, 2020)

the jump is of great importance in the ballet and the student flies in the air to perform a movement with air before landing.

The skill Pas Echappe´ is divided into three types:

- Echappe´ Sur Les Pointes
- Le Petit Echappe´
- Le Grand Echappe´

Le Petit Echappe´'s breakout skill is one of the leaps that require great skill to control the leg muscles and which require a long period of training. ("The "Non-Traditional Ballet Body" in the Ballet, 2013; "The "Non-Traditional Ballet Body" in the Ballet, 2013; Klapper, 2020; saleh &ahmed al sabw, 2020b)

The skill Le Petit Echappe´ performs from (the fifth position of the feet. The right in front

- bending the knees - the arms, the first position). The student pushes the ground to rise high withthe legs open to take the second position in the air. With the knees and the two feet straight, then landing in the fifth position - the left foot forward and the knees bent (dos Santos et al., 2020; Mayes et al., 2020; Satama & Huopalainen, 2018)

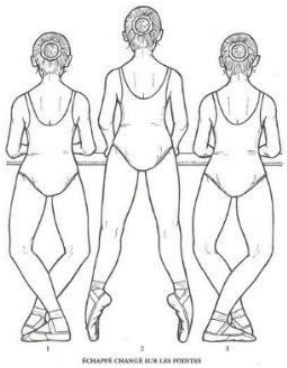


Figure (1) Le Petit Echappe´

2/0 Research importance and problem:

Le Petit Echappe´ is considered one of the most difficult leaps in ballet, which requires control of the muscles of the legs in particular, which has lost the skill and the motor sentence as a whole its aesthetic form, so it needs a long period of training to master and perform correctly, and through the great importance of the skill Under study, the researcher sought to analyze the performance of the skill kinematically using two types of shoes, namely:

- Training Pointe
- Professional Pointe

Where the researcher analyzes the performance of Le Petit Echappe´'s loose skill in ballet by comparing the performance of the skill under investigation using two types of ballet shoes, and relying on kinematic analysis in skill analysis as an effective measurement method, which may lead dancers to the performance of the skill in the most appropriate form. This is what serves the theoretical and practical aspects in the field of ballet and those in charge of the education and training process.

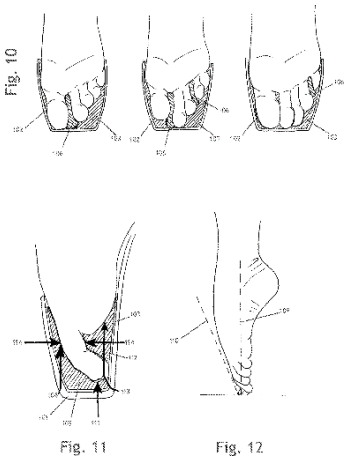


Figure (1) Foot shapes inside Training Pointe and Performance Pointe
(Pinterest, n.d.-b) (Hendry et al., 2015; Swain et al., 2019)Also, to the best of the researcher's knowledge, the kinematic comparison of ballet skills performance was not made using different types of shoes, which may have a significant impact on the form of performance and kinematics of movement.

3/0 Research Goals:

This study aims to identify:

1/3/1 The lower limb kinematic properties of Le Petit Echappe in ballet with Training Pointe andProfessional Pointe shoes

1/3/2 the lower limb kinematic properties of Le Petit Echappe´ in ballet with Professional Pointeshoe

1/3/3 the kinematic differences in the two measurements using my Training Pointe andPerformance Pointe shoes for Le Petit Echappe´'s ballet breakout.

4/0 Research Questions:

1/4/1 What are the kinematic properties of the lower limb of Le Petit Echappe´ in balletusing Training Pointe and Performance Pointe shoes?

1/4/2 Are there kinematic differences in the two measurements using my Training Pointeand Performance Pointe shoes for Le Petit Echappe´ ballet?

5/0 Terms and Symbols used in the study:

5/1 Terms used in the study:

- **Pas Echappe´:**

"One of the ballet fastnesses that needs to be superior in the muscles of the legs is where the feet are bounced together and then landed on them." (hany abdelaziz ibrahim Saleh & ahmed al sabw, 2020)

- **Ballet:**

"Ballet is that integrated art that performs with specific movements in a specific place and by people trained and at a rhythm to express an idea or a story." (Klapper, 2020)

5/2 Symbols used in the study:

Terms	Symbol	measuring unit
- Time	t	Sec
- Horizontal displacement Component	Dx	Cm
- Vertical displacement Component	Dy	Cm
- Absolute displacement	Dr	Cm
- Horizontal Velocity	Vx	Cm/sec
- Vertical Velocity	Vy	Cm/sec
- Absolute Velocity	Vr	Cm/sec
- Horizontal Acceleration	Ax	Cm/sec^2
- Vertical Acceleration	Ay	Cm/sec^2
- Absolute Acceleration	Ar	Cm/sec^2
- Angle	ang	degree

6/0 Research Procedures:

6/1 Research Methodology

The researcher used the descriptive approach to suit the nature of the study.

6/2 Research Simple:

The basic study sample was chosen by the intentional method from the students of the fourth year at the Faculty of Physical Education for Boys - Girls in Port Said, and the sample included (5) students.

Table 1. The Description of research sample (n=5)

			Measurement Unit	Mean	standard deviation	torsion coefficient
Growth rates	1	Tall	Cm	174	0.707	0.000
	2	Wight	Kg	64.2	0.836	0.512-
	3	Age	Month	240.8	0.836	0.512
	4	Training age	Month	119.6	0.547	0.609-

From Table (1) it is clear that the values of the torsion coefficient for each of these variables (understudy) have been limited to (± 3), which indicates the moderation of the iterative curve of the study sample in these variables.

6/3 Data collection tools:

5/3/1 Biomechanics Data collection tools:

Capture, 3D Video by Gopro hero4 black Camera (240fbs)

Figure (2) Gopro hero4 black

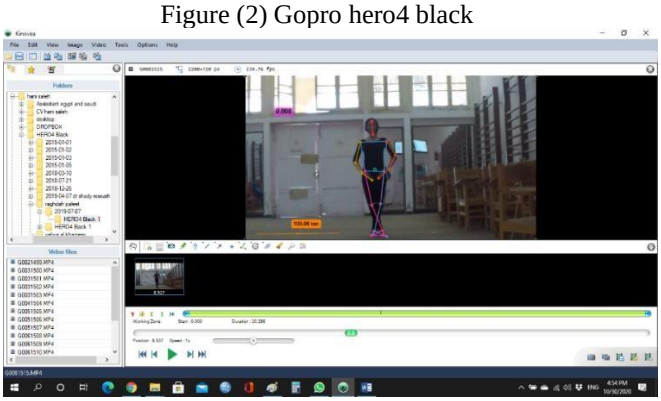
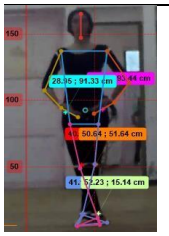
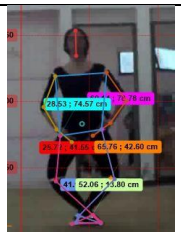
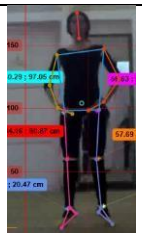


Figure (3) Kinovea

Phase1	Phase2	Phase3
t	T	T
Dx, Dy, Dr Vx, Vy, Vr Ax, Ay, Ar Ankle`s angle	Dx, Dy, Dr Vx, Vy, Vr Ax, Ay, Ar Ankle`s angle	Dx, Dy, Dr Vx, Vy, Vr Ax, Ay, Ar Ankle`s angle

Figure (4) Kinematical Model

6/3/2 Anthropometric Data collection tools

The methods and tools for data collection that are appropriate to the nature of the study have been identified by reviewing the scientific references, research and previous studies in the field of ballet training, and the researcher has used the following tests, measures and devices:

- Restmeter to measure the total length of the body.
- Medical balance device to measure the mass of the player.

6/4 Pilot Study:

The two researchers conducted an exploratory study to identify the conditions and problems that the researcher may face during the basic study, and it was implemented on Sunday 9/6/2019 at the College of Physical Education for Boys - Girls in Port Said. And the pilot experiment was conducted on one student. The exploratory study aimed to identify:

- Dimensions and frequencies for cameras.
- Visibility through cameras to facilitate later analysis. And the pilot study achieved its objectives.

6/5 Basic study:

The basic study was carried out on Monday 10/6/2019 at the Physical Education Directorate for Boys - Girls in Port Said.

6/6 Statistical Treatments

The researcher used the program (Statistical Package for Social Science) (SPSS 20) in the processing of data statistically using the appropriate statistical coefficients of the study.

7/0 Results:

7/1 Present the results:

This chapter includes the presentation and discussion of the results of the study in light of the data and results of the measurements of the variables under study on the sample and based on the results of the statistical analysis that are in line with the nature of the current study. In light of the study hypotheses, the researchers will present the results that were reached as follows:

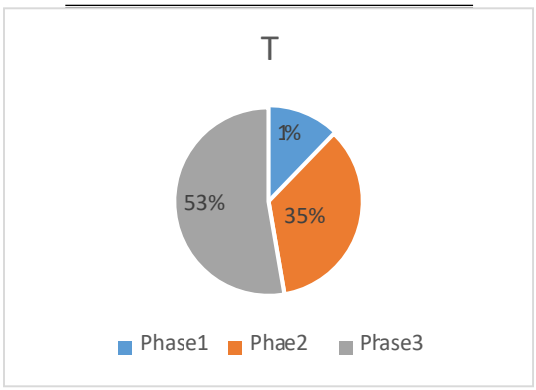
1/4/1 kinematic variants of the lower limb using the Training Pointe:

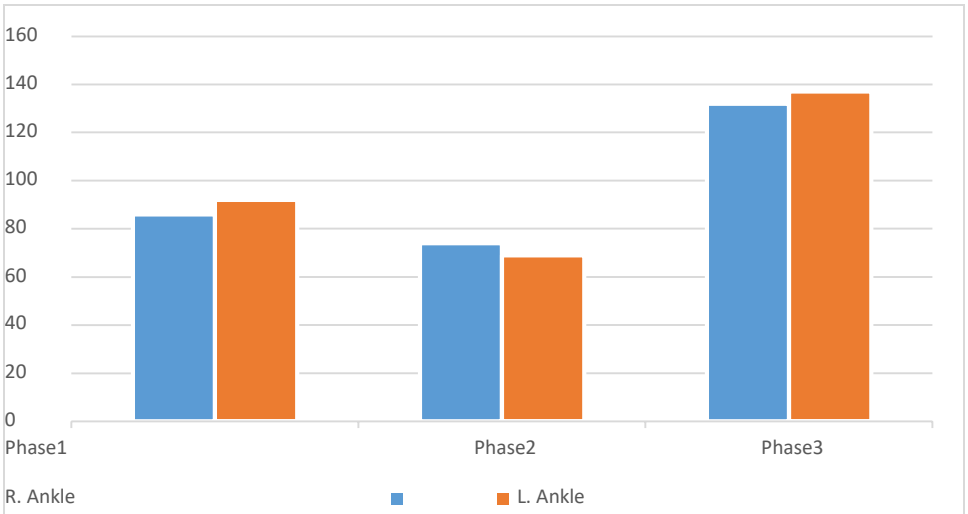
Table (2) Medians of kinematic variables for the lower extremity Training Pointe

Phases		Time	L.Toes	R.Toes	L.Heel	R.Heel	L.Ankle	R.Ankle
Phase1		0.525	0.350326	0.094679	-0.09686	0.280337	-0.33064	0.489942
Phase2	Dx	1.509	1.660494	0.009603	-1.45699	1.879835	-2.23596	2.879708
Phase3		2.268	-5.60871	13.04783	-15.7117	17.94396	-16.6773	20.21468
Phase1		0.525	-0.5545	-0.08613	-0.22754	-0.51859	-0.22757	-0.2534
Phase2	**Dy**	1.509	-0.57576	-0.19893	-0.98092	-2.04062	-0.87539	-1.71649
Phase3		2.268	-1.04198	-3.37673	-9.74968	-10.7145	-11.1585	-8.59187
Phase1		0.525	0.96356	0.621802	0.757904	0.882232	1.349828	1.122476
Phase2	**Dr**	1.509	5.585859	3.437659	3.925933	5.471833	5.393841	6.131842
Phase3		2.268	21.94772	21.8263	23.00183	25.49387	26.44228	26.73485
Phase1		0.525	4.218083	0.343699	-0.96648	3.890327	-1.41523	4.061176
Phase2	**Vx**	1.509	6.38791	14.56552	-28.1843	27.47362	-42.8676	52.47398
Phase3		2.268	-94.3117	81.5809	-110.654	125.4776	-88.9969	85.44677
Phase1		0.525	-3.89578	1.239569	0.209922	-3.51283	-0.1493	-1.74721
Phase2	**Vy**	1.509	5.790973	-13.0782	-34.6276	-31.0097	-31.4422	-27.6092
Phase3		2.268	-2.48412	13.05588	-7.65387	-21.1967	-24.9659	-12.2757
Phase1		0.525	6.954707	3.984534	4.829377	6.724501	8.377819	7.912573
Phase2	**Vr**	1.509	35.28839	35.55063	48.5682	51.52356	60.65335	68.52509
Phase3		2.268	105.4417	115.087	117.1519	129.6015	105.5948	90.03976
Phase1		0.525	23.60339	10.71265	5.897971	12.31058	15.04186	10.20107
Phase2	**Ax**	1.509	3.672614	7.383528	-15.7276	14.68005	-23.9495	28.51955
Phase3		2.268	-42.6881	38.86599	-49.625	56.68156	-39.2504	38.30134
Phase1		0.525	-75.4973	-14.7073	-57.8891	-52.9079	-65.4428	-42.5908
Phase2	**Ay**	1.509	3.517337	-7.24456	-18.5934	-16.7437	-16.8162	-15.2967
Phase3		2.268	-2.08607	4.570621	-4.31794	-10.1852	-12.5784	-6.04256
Phase1		0.525	82.40664	26.17282	66.2135	58.6092	86.54376	56.09343
Phase2	**Ar**	1.509	21.46257	20.0963	27.5661	30.64124	34.27292	39.17398
Phase3		2.268	47.33209	52.41764	52.61327	58.71075	47.15706	40.38414

Table (3) Body angles under study Training Pointe

	Phase1	Phase2	Phase3
T	0.525	1.509	2.268
R. Ankle	86°	74°	132°
L. Ankle	92°	69°	137°




160
140
120
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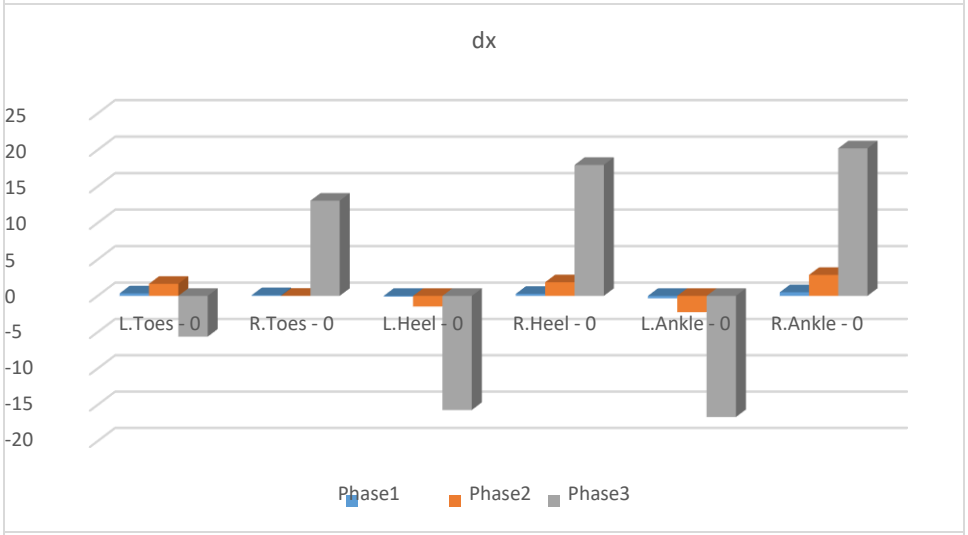
0
Phase1
Phase2
Phase3
R. Ankle
L. Ankle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L.Toes - 0
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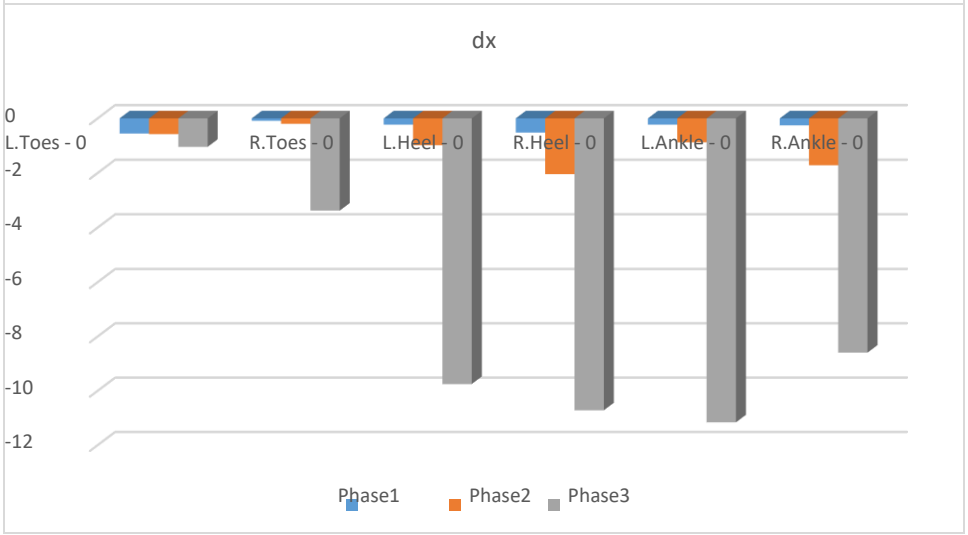
R.Heel - 0
L.Ankle - 0
R.Ankle - 0
Phase1
Phase2
Phase3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L.Toes - 0
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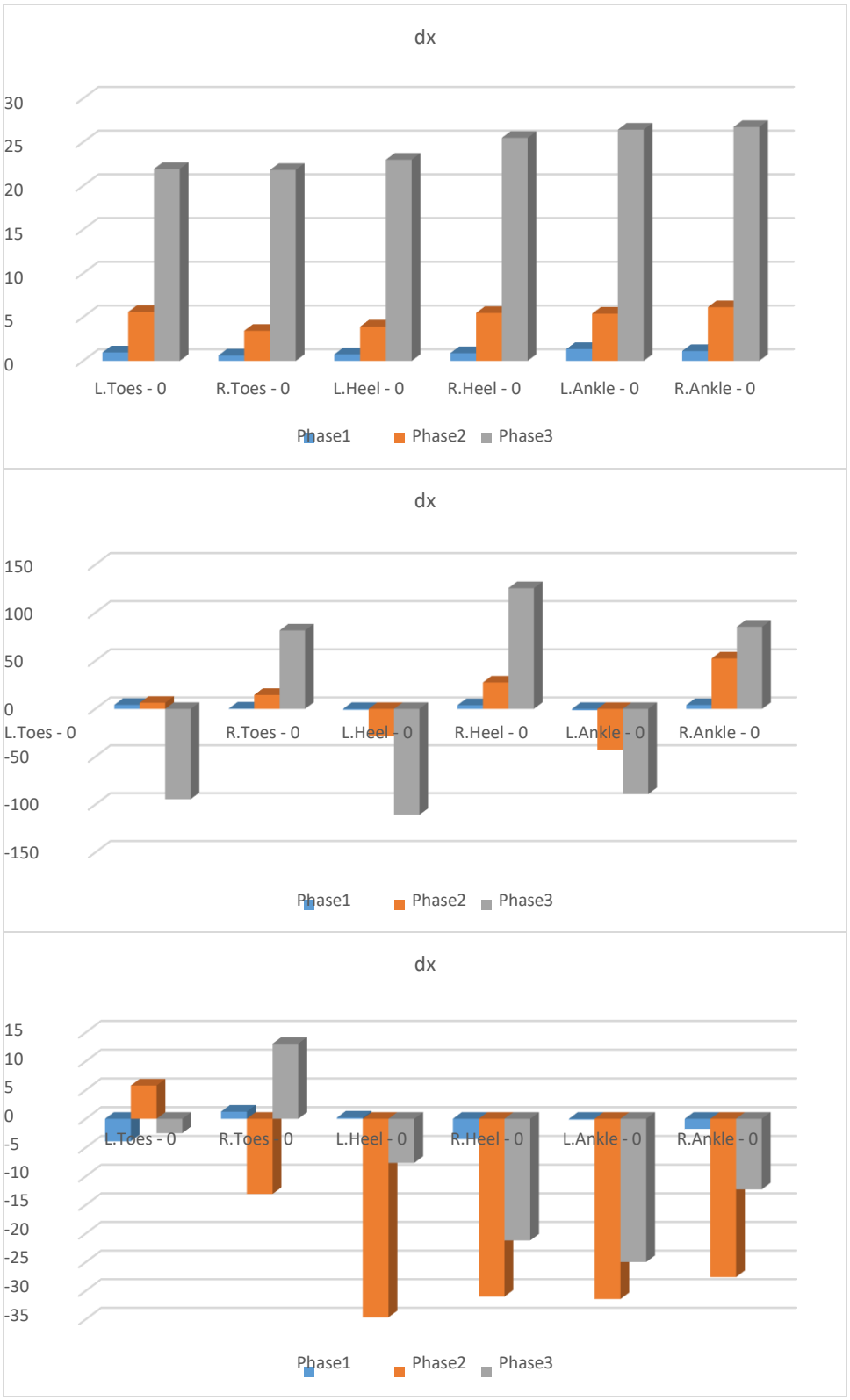
L.Heel - 0
R.Heel - 0
L.Ankle - 0
R.Ankle - 0
Phase1
Phase2
Phase3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L.Toes - 0
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L.Heel - 0
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L.Ankle - 0
R.Ankle - 0
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Phase2
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L.Toes - 0
R.Toes - 0
L.Heel - 0
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L.Ankle - 0
R.Ankle - 0
Phase1
Phase2
Phase3
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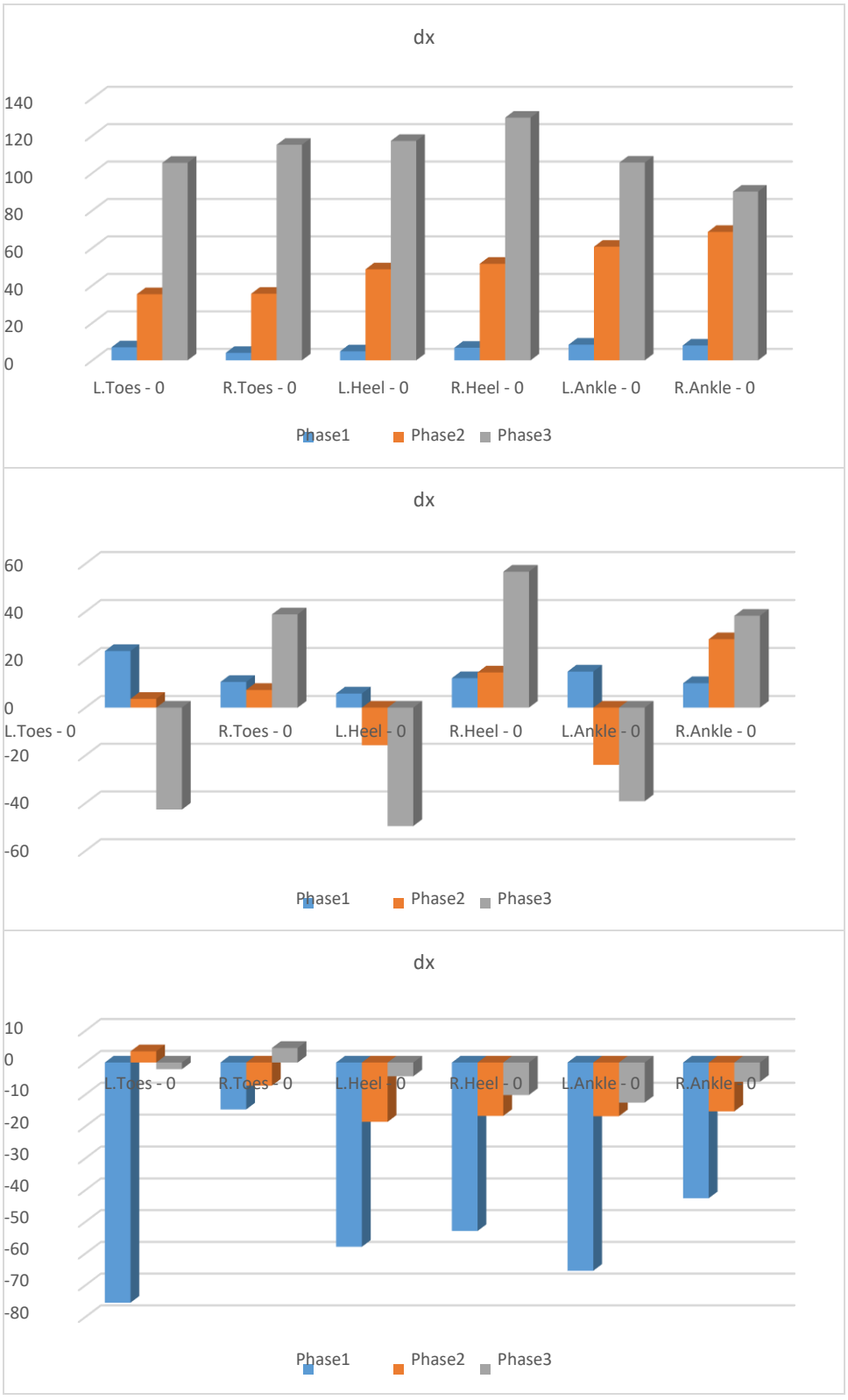
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L.Toes - 0
R.Toes - 0
L.Heel - 0
R.Heel - 0
L.Ankle - 0
R.Ankle - 0
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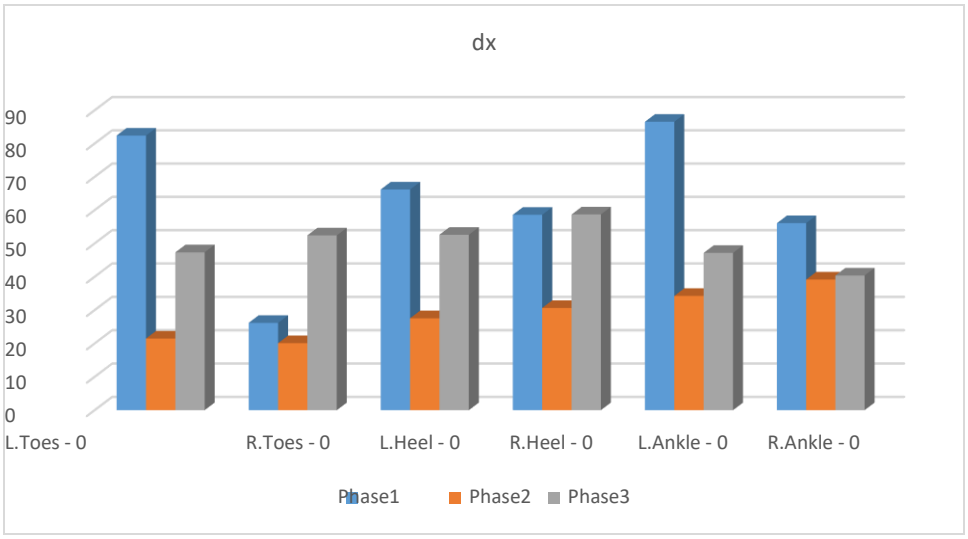
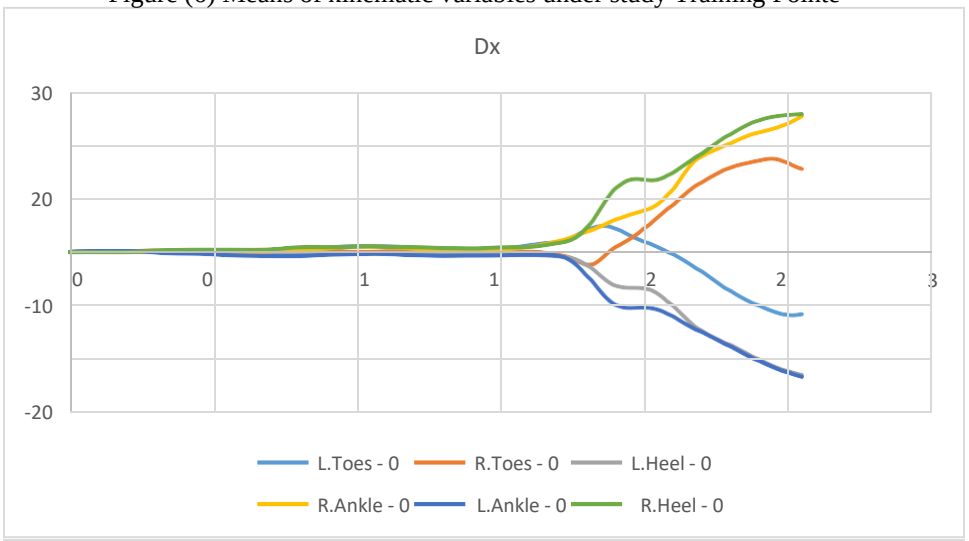
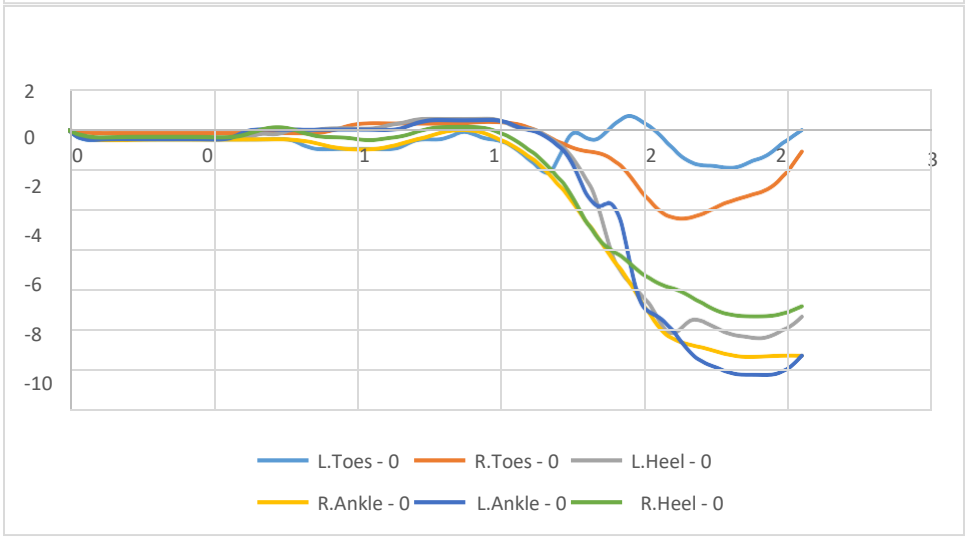
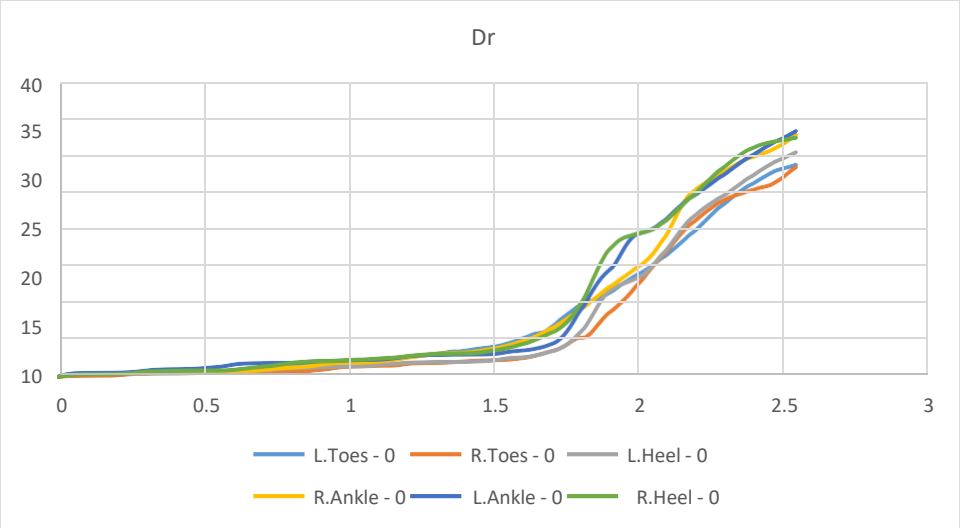


Figure (6) Means of kinematic variables under study Training Pointe



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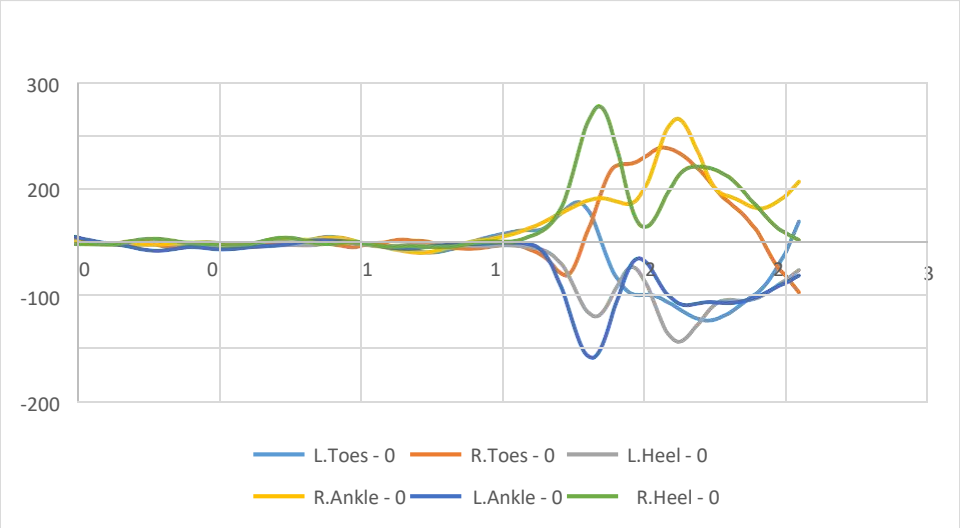
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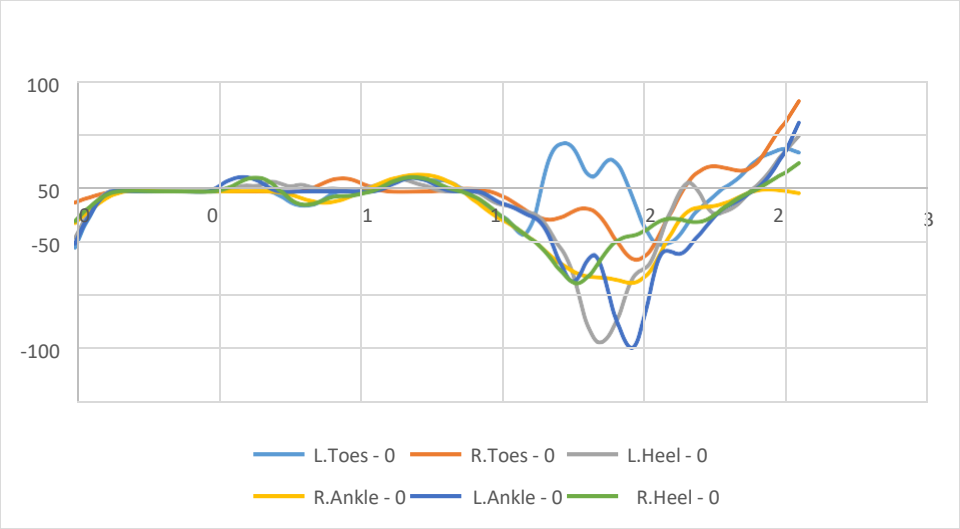
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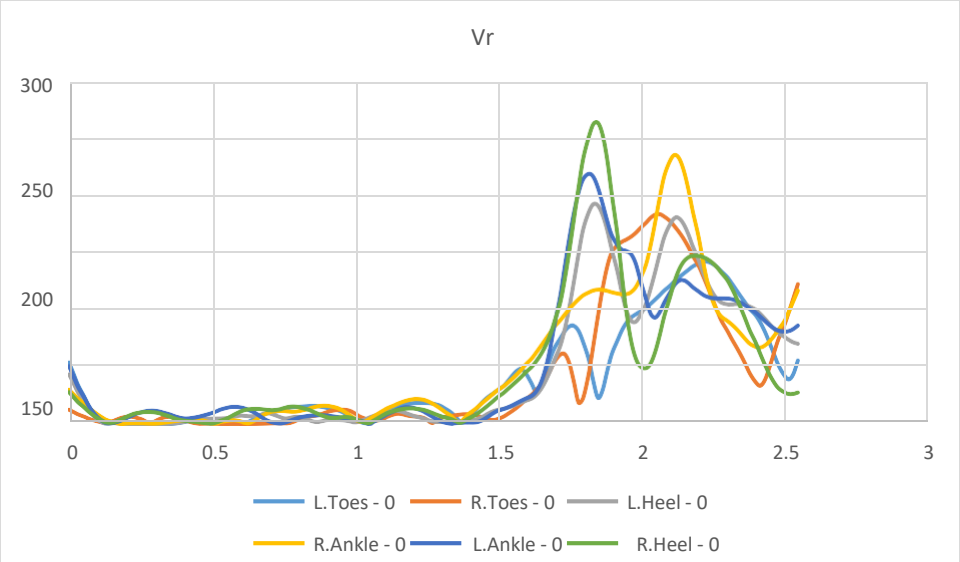
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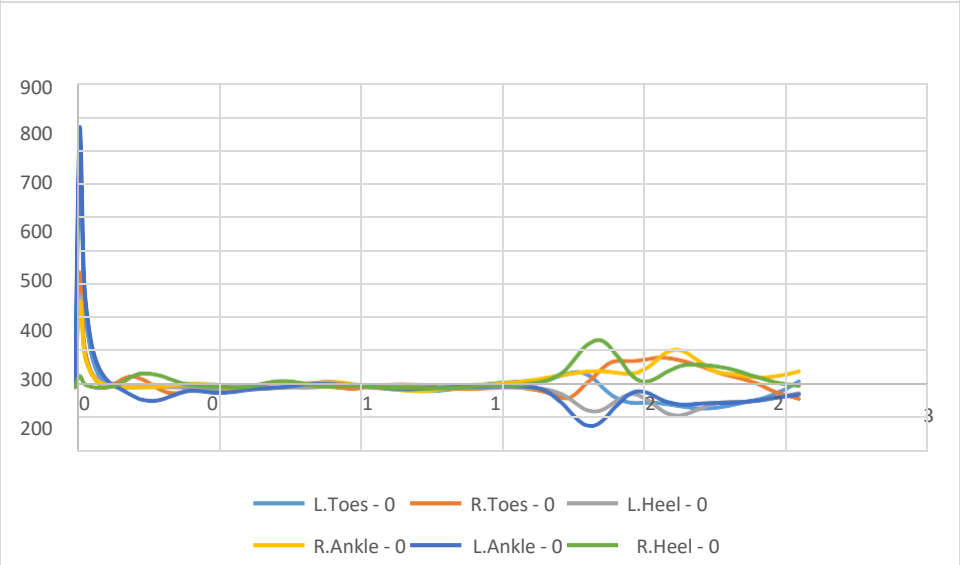
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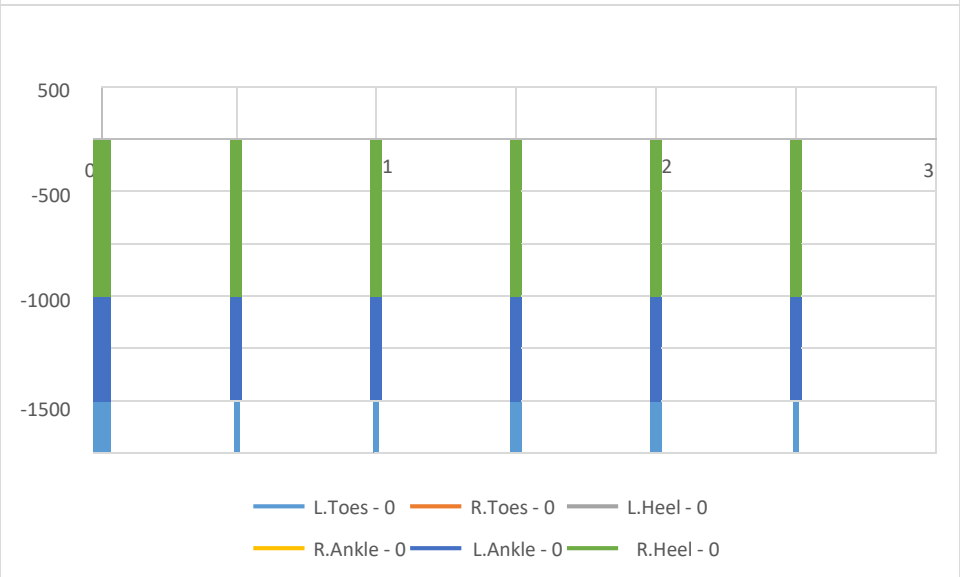
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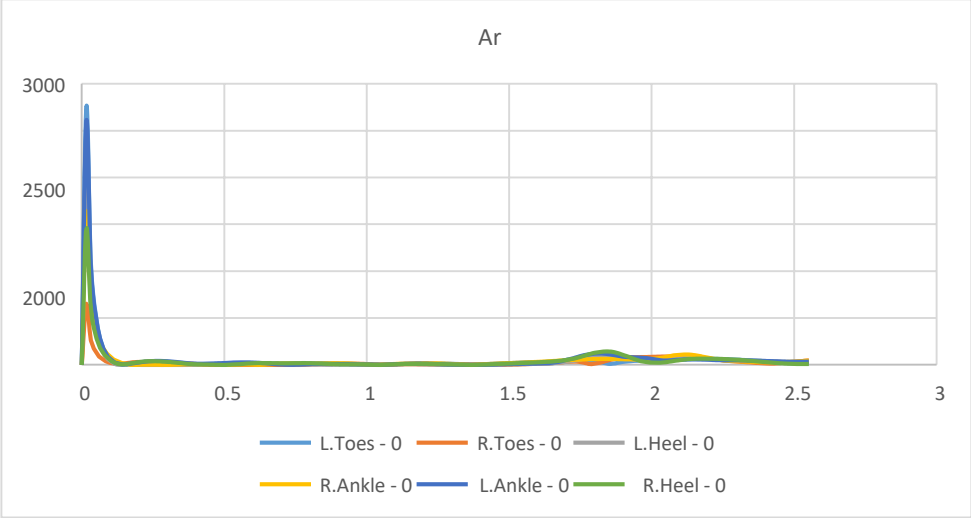


Figure (7) Kinematic variables under study Training Pointe

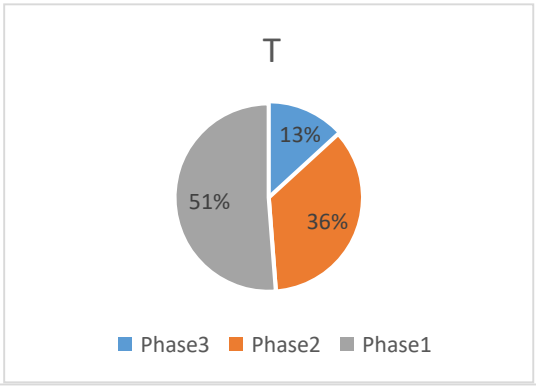
4/1/2 kinematic variants of the lower limb using Professional Pointe shoe:

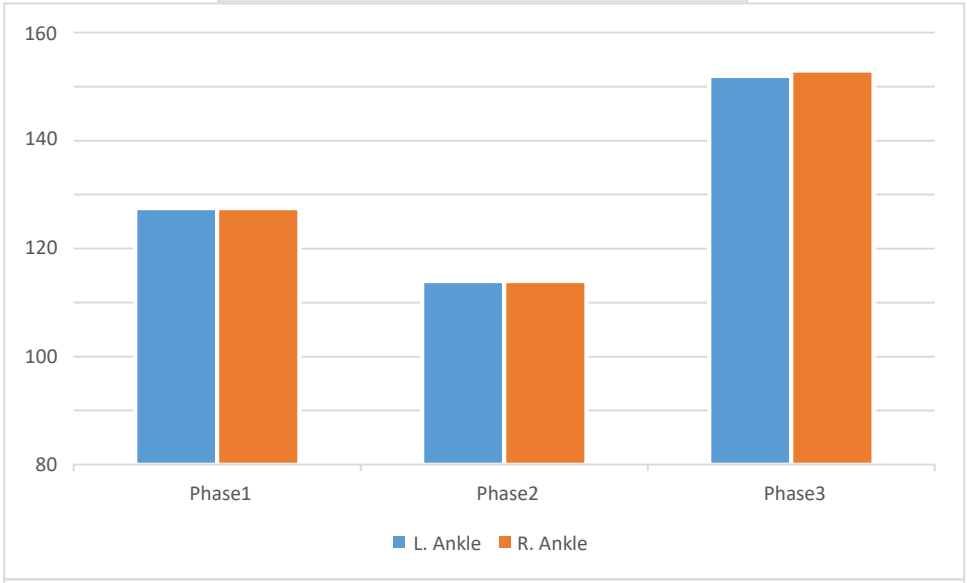
Table (4) Average of the lower end kinematic variables Professional Pointe

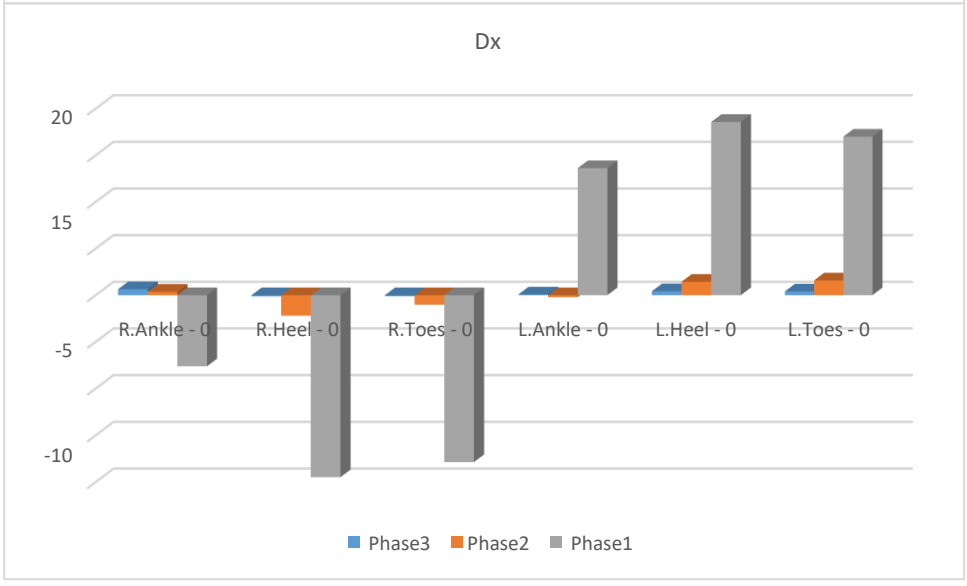
Phases		Time	L.Toes	R.Toes	L.Heel	R.Heel	L.Ankle	R.Ankle
Phase1		0.550	0.632789	-0.12962	-0.12327	0.078439	0.423813	0.396497
Phase2	Dx	1.4848	0.367801	-2.2026	-1.01534	-0.20746	1.430952	1.577478
Phase3		2.135	-7.62403	-19.4806	-17.8711	13.61124	18.56671	16.98828
Phase1		0.550	-0.43241	-0.08844	-0.18935	-0.29474	-0.02252	-0.11583
Phase2	**Dy**	1.4848	0.285943	-1.48465	-1.12672	-0.69716	-1.35878	-0.80719
Phase3		2.135	-0.34733	-13.749	-12.2837	-3.12162	-10.6952	-10.6216
Phase1		0.550	1.504256	1.236362	1.857534	1.228517	0.91054	0.921591
Phase2	**Dr**	1.4848	6.696848	6.768519	7.858622	4.990267	6.602366	6.253695
Phase3		2.135	18.66693	29.17768	29.78626	23.21371	28.78587	25.84347
Phase1		0.550	2.109904	-1.64657	1.279895	1.450215	1.257455	1.992453
Phase2	**Vx**	1.4848	-8.54324	-47.5795	-45.3655	11.78397	32.17601	42.92696
Phase3		2.135	-91.2906	-116.201	-116.872	124.5995	149.7756	114.4771
Phase1		0.550	0.457443	3.226571	3.798106	1.340058	2.584737	4.857728
Phase2	**Vy**	1.4848	-1.4619	-56.3137	-50.1068	-18.2408	-51.4883	-48.6812
Phase3		2.135	4.401257	-39.1598	-39.4292	14.35241	-21.8096	-28.3059
Phase1		0.550	11.5461	12.05602	15.71532	10.47325	9.158094	9.59326
Phase2	**Vr**	1.4848	34.35256	76.60374	75.94438	41.68795	68.35863	72.99914
Phase3		2.135	96.1628	124.4547	125.6488	132.7677	151.7483	120.0108
Phase1		0.550	43.22977	36.13501	68.43874	36.25446	11.97476	47.93422
Phase2	**Ax**	1.4848	-4.74733	-27.8028	-25.7309	5.631739	18.71328	24.60767
Phase3		2.135	-43.0055	-56.3481	-56.1422	60.79083	72.13399	54.39891
Phase1		0.550	-58.1697	-3.647	-26.2819	-5.31714	-3.96705	-20.8735
Phase2	**Ay**	1.4848	-0.82066	-33.5256	-30.0423	-11.3005	-30.3603	-29.1006
Phase3		2.135	1.44034	-19.6716	-19.7041	5.77332	-10.4708	-14.1313
Phase1		0.550	86.01586	57.37925	103.6111	53.36427	24.02562	63.85514
Phase2	**Ar**	1.4848	22.30054	45.46581	45.05749	25.05135	42.01618	44.15062
Phase3		2.135	45.15318	60.53086	60.53534	64.58519	73.07944	57.19701

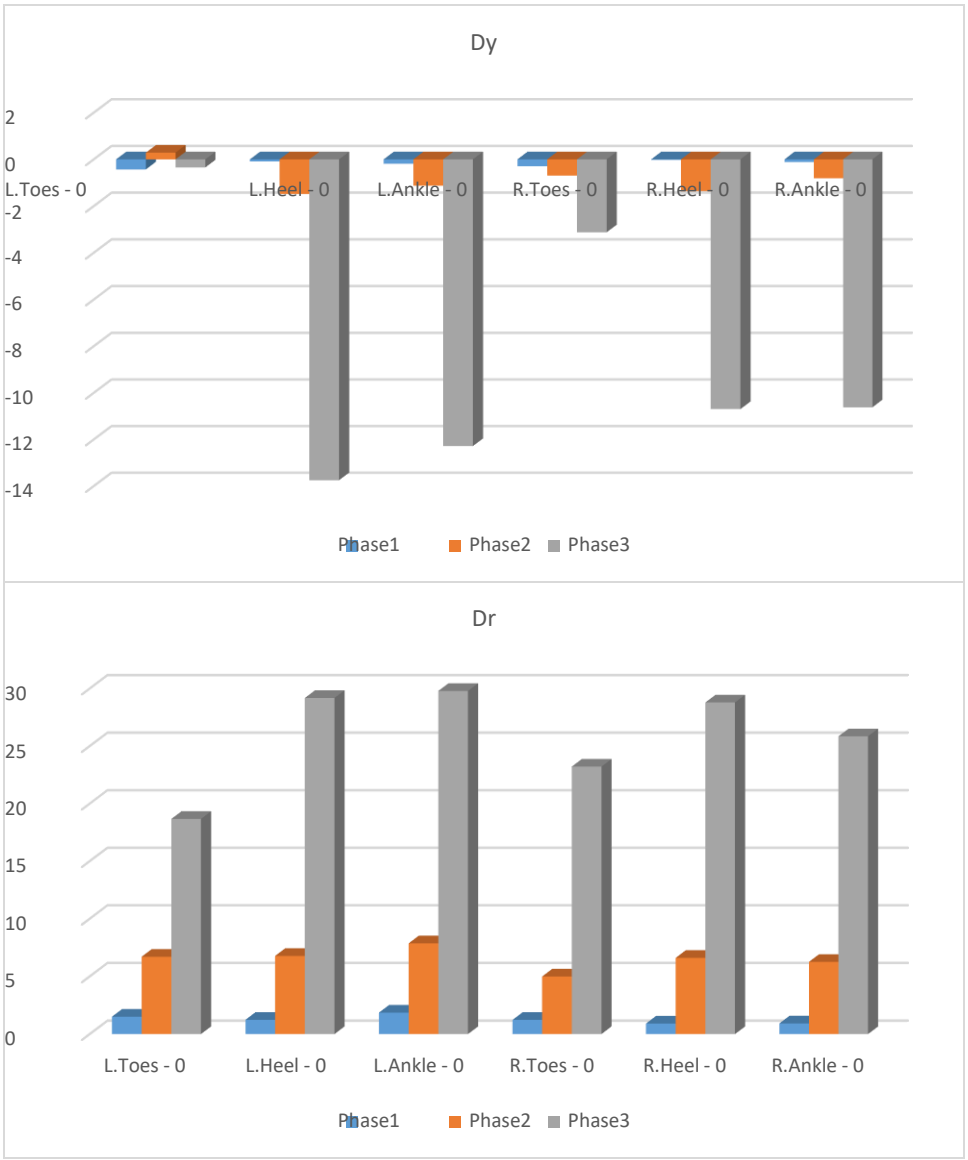
Table (5) Angles of the body under study Professional Pointe

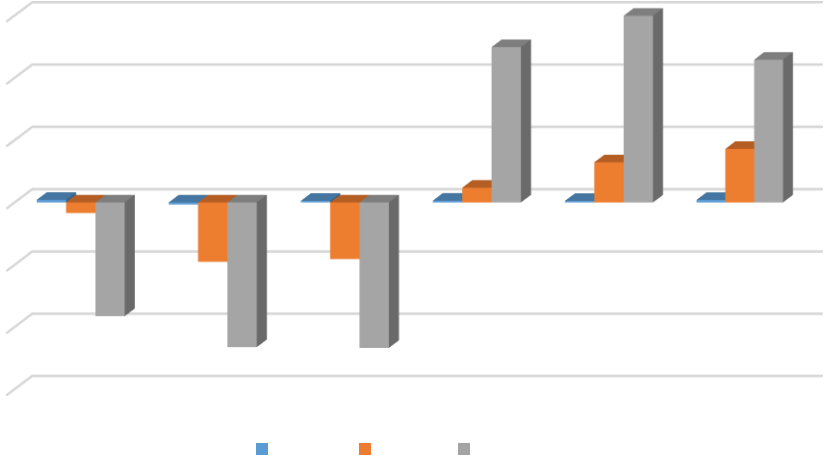
Phase1		Phase2	Phase3
T	0.55	1.484	2.135
R. Ankle	95°	68°	144°
L. Ankle	95°	68°	146°

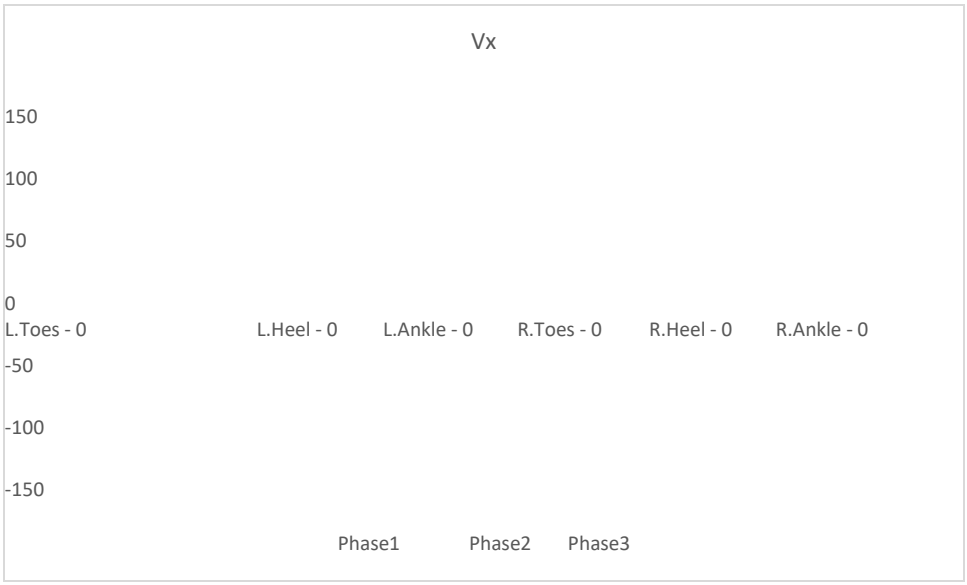

T
13%
36%
51%
Phase3
Phase2
Phase1

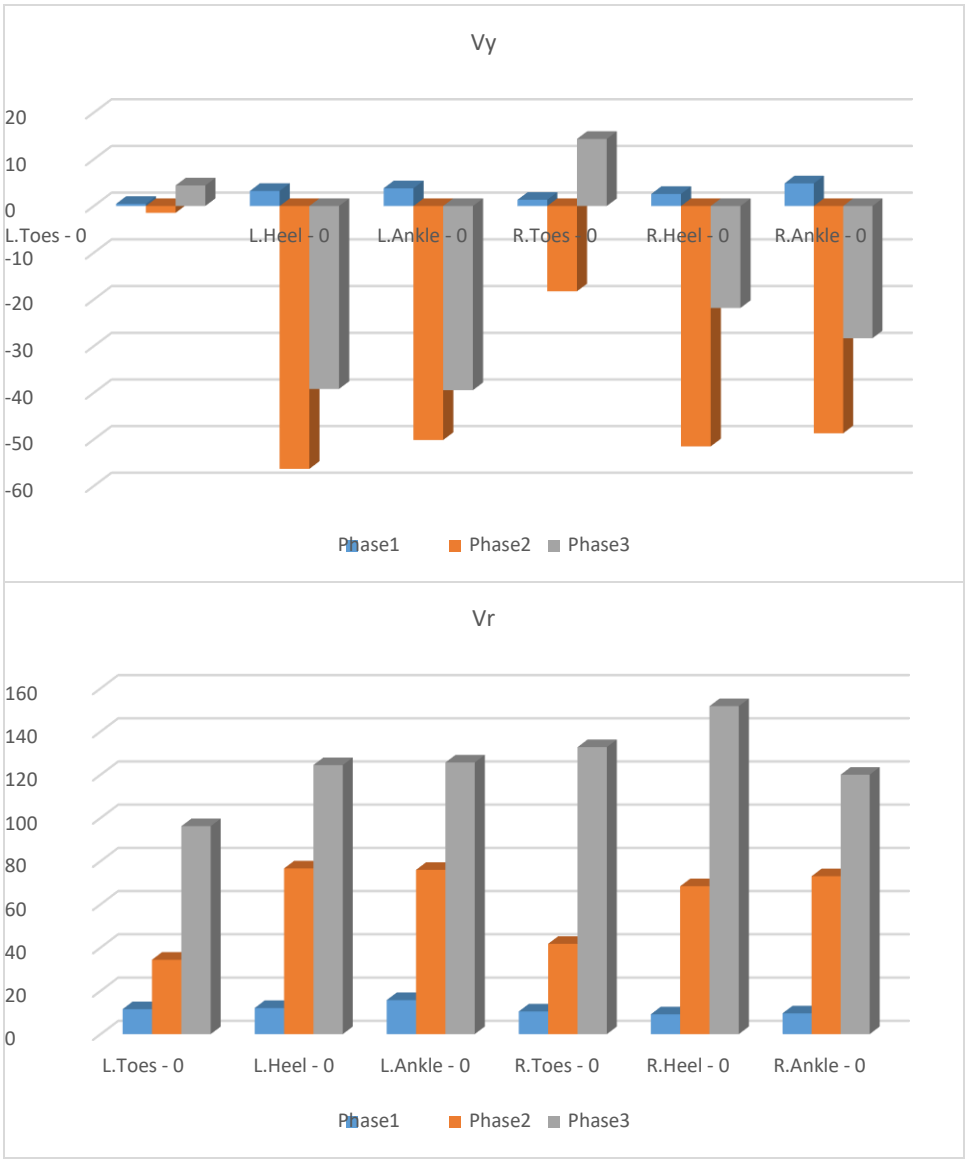

160
140
120
100
80
Phase1
Phase2
Phase3
L. Ankle
R. Ankle

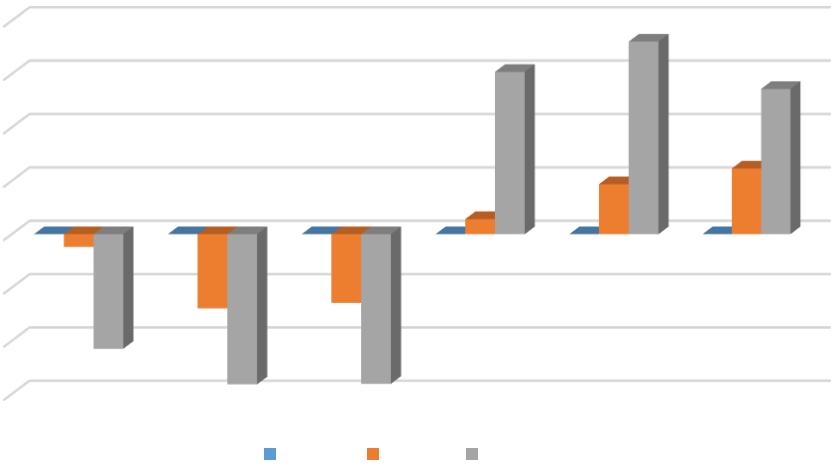

Dx
20
15
-5
-10
R.Ankle - 0
R.Heel - 0
R.Toes - 0
L.Ankle - 0
L.Heel - 0
L.Toes - 0
Phase3
Phase2
Phase1

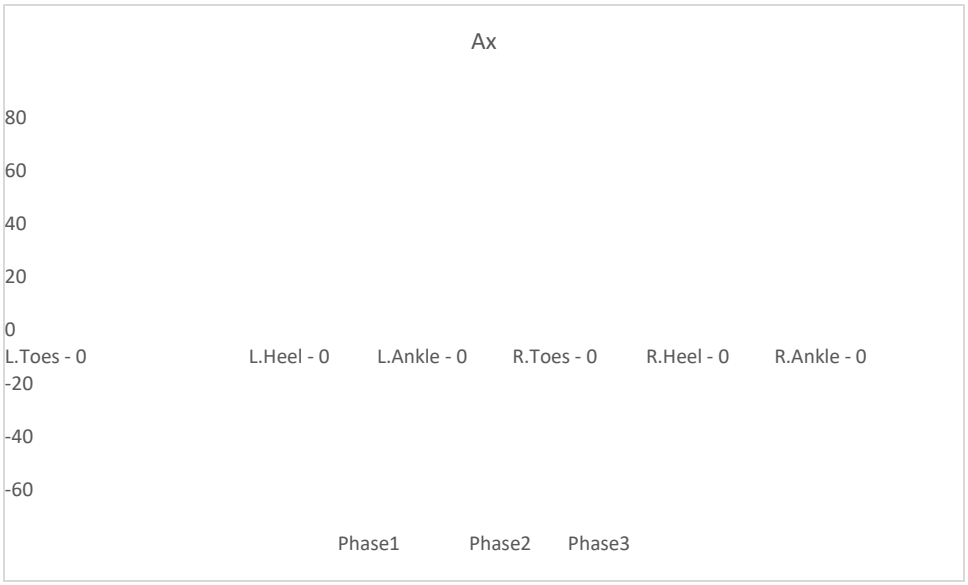

Dy
2
0
-2
-4
-6
-8
-10
-12
-14
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Toes - 0
R.Heel - 0
R.Ankle - 0
Phase1
Phase2
Phase3
Dr
30
25
20
15
10
5
0
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Toes - 0
R.Heel - 0
R.Ankle - 0
Phase1
Phase2
Phase3




Vx
150
100
50
0
-50
-100
-150
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Toes - 0
R.Heel - 0
R.Ankle - 0
Phase1
Phase2
Phase3


Vy
20
10
0
-10
-20
-30
-40
-50
-60
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Toes - 0
R.Heel - 0
R.Ankle - 0
Phase1
Phase2
Phase3
Vr
160
140
120
100
80
60
40
20
0
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Toes - 0
R.Heel - 0
R.Ankle - 0
Phase1
Phase2
Phase3




Ax
80
60
40
20
0
-20
-40
-60
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Toes - 0
R.Heel - 0
R.Ankle - 0
Phase1
Phase2
Phase3

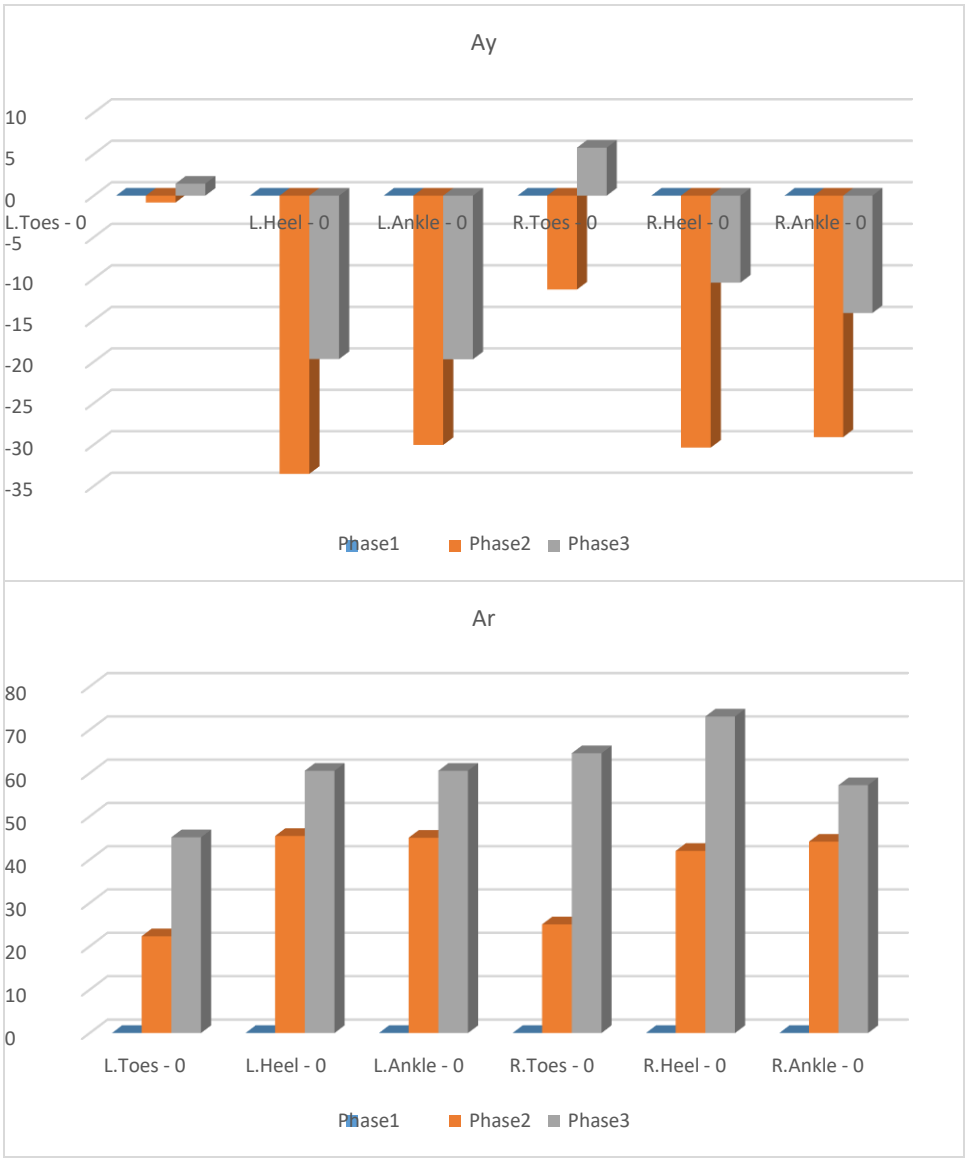
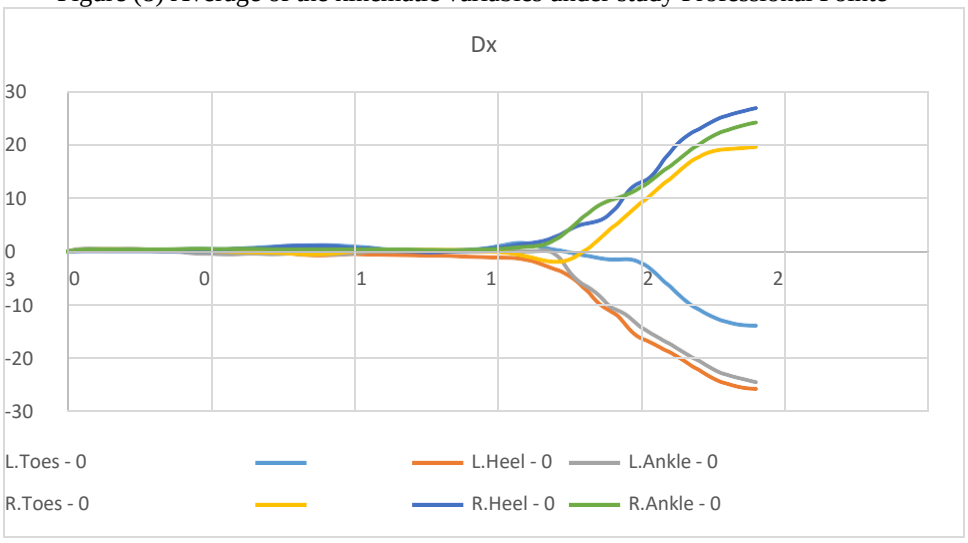
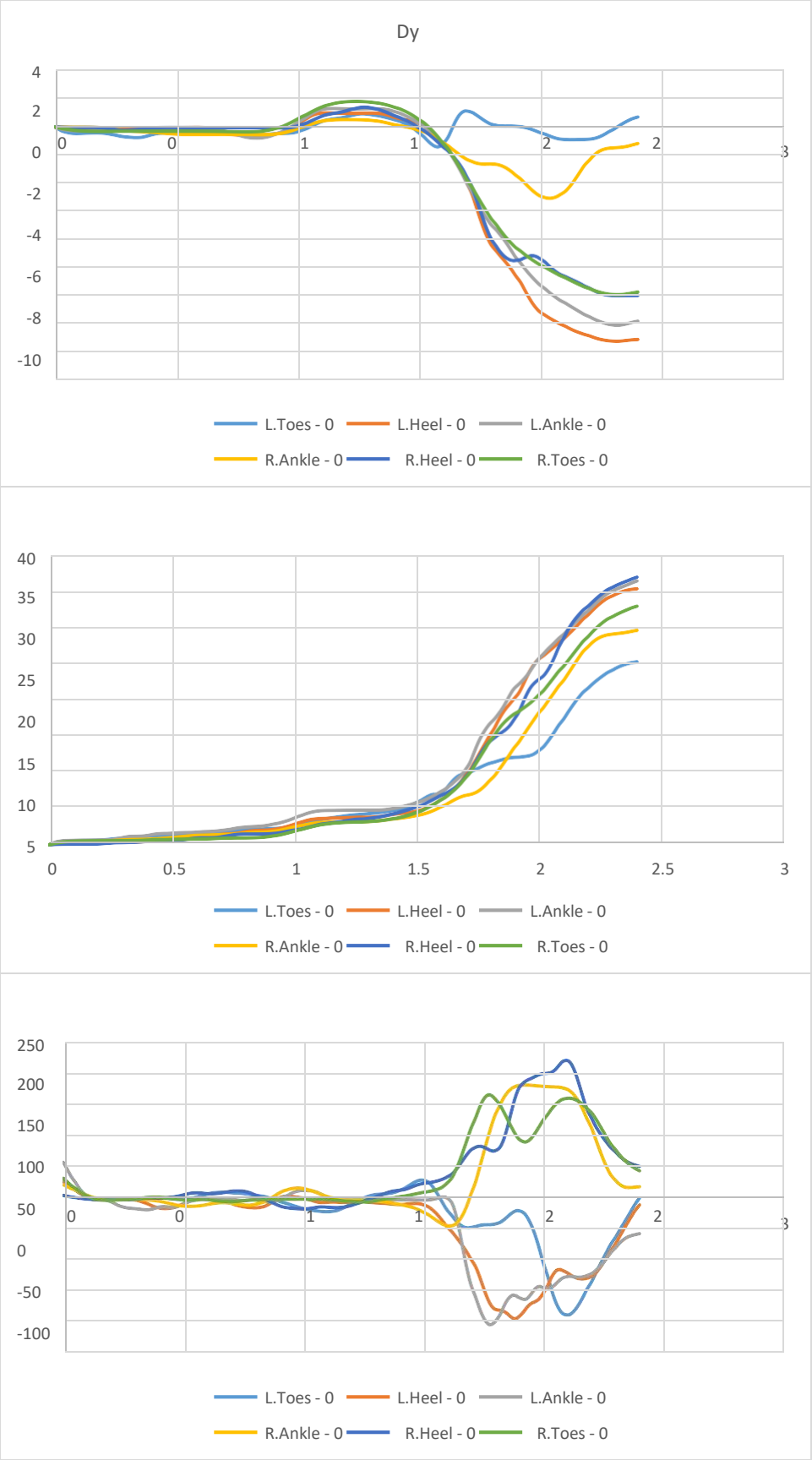
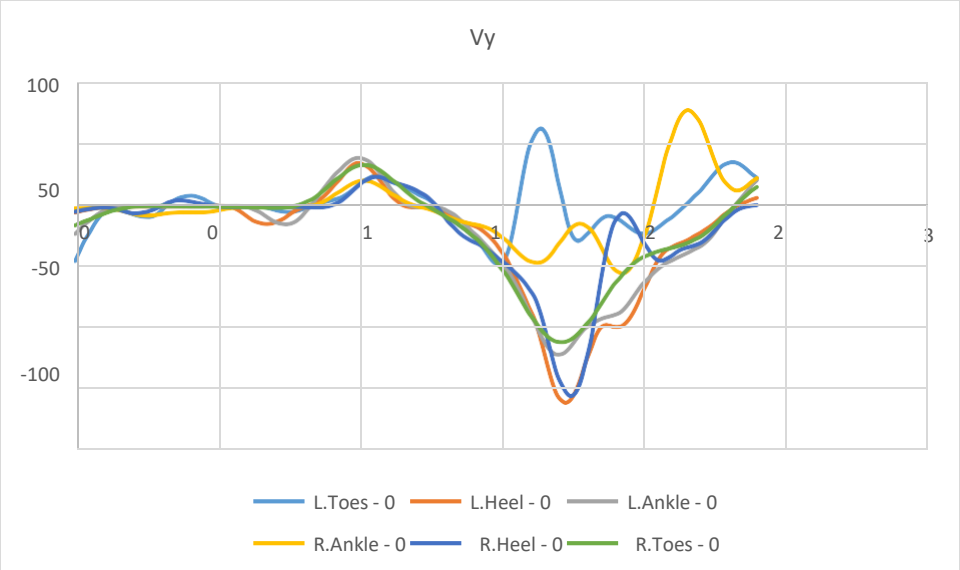
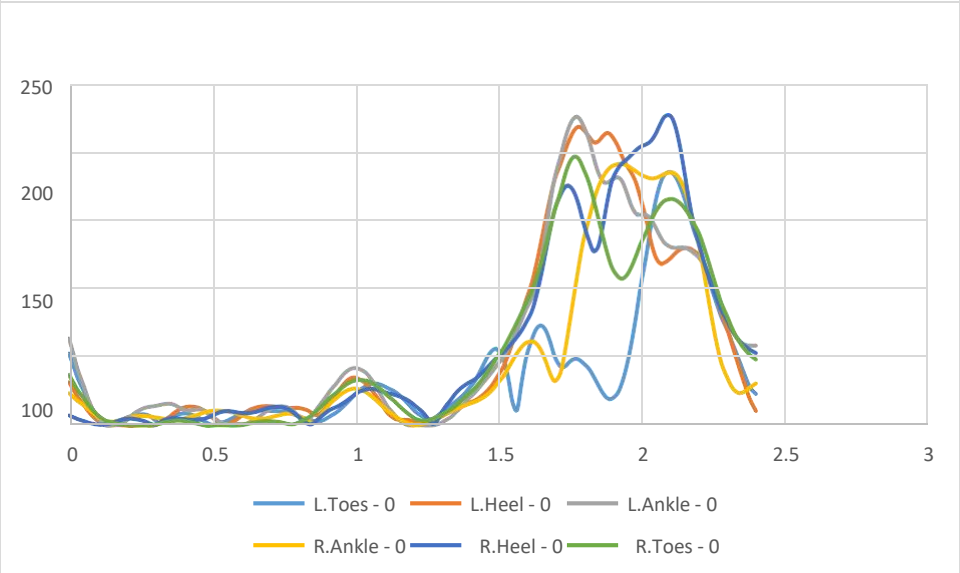


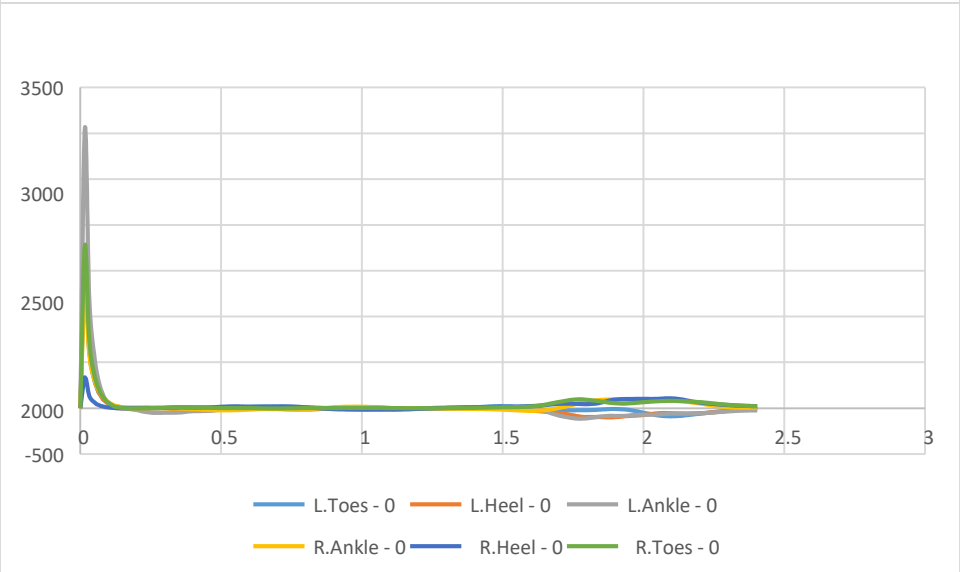
Figure (8) Average of the kinematic variables under study Professional Pointe




Dy
4
2
0
-2
-4
-6
-8
-10
0
0
1
1
2
2
3
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Ankle - 0
R.Heel - 0
R.Toes - 0
40
35
30
25
20
15
10
5
0
0.5
1
1.5
2
2.5
3
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Ankle - 0
R.Heel - 0
R.Toes - 0
250
200
150
100
50
0
-50
-100
0
0
1
1
2
2
3
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Ankle - 0
R.Heel - 0
R.Toes - 0


Vy
100
50
-50
-100
0
0
1
1
2
2
3
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Ankle - 0
R.Heel - 0
R.Toes - 0


250
200
150
100
0
0.5
1
1.5
2
2.5
3
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Ankle - 0
R.Heel - 0
R.Toes - 0


3500
3000
2500
2000
-500
0
0.5
1
1.5
2
2.5
3
L.Toes - 0
L.Heel - 0
L.Ankle - 0
R.Ankle - 0
R.Heel - 0
R.Toes - 0

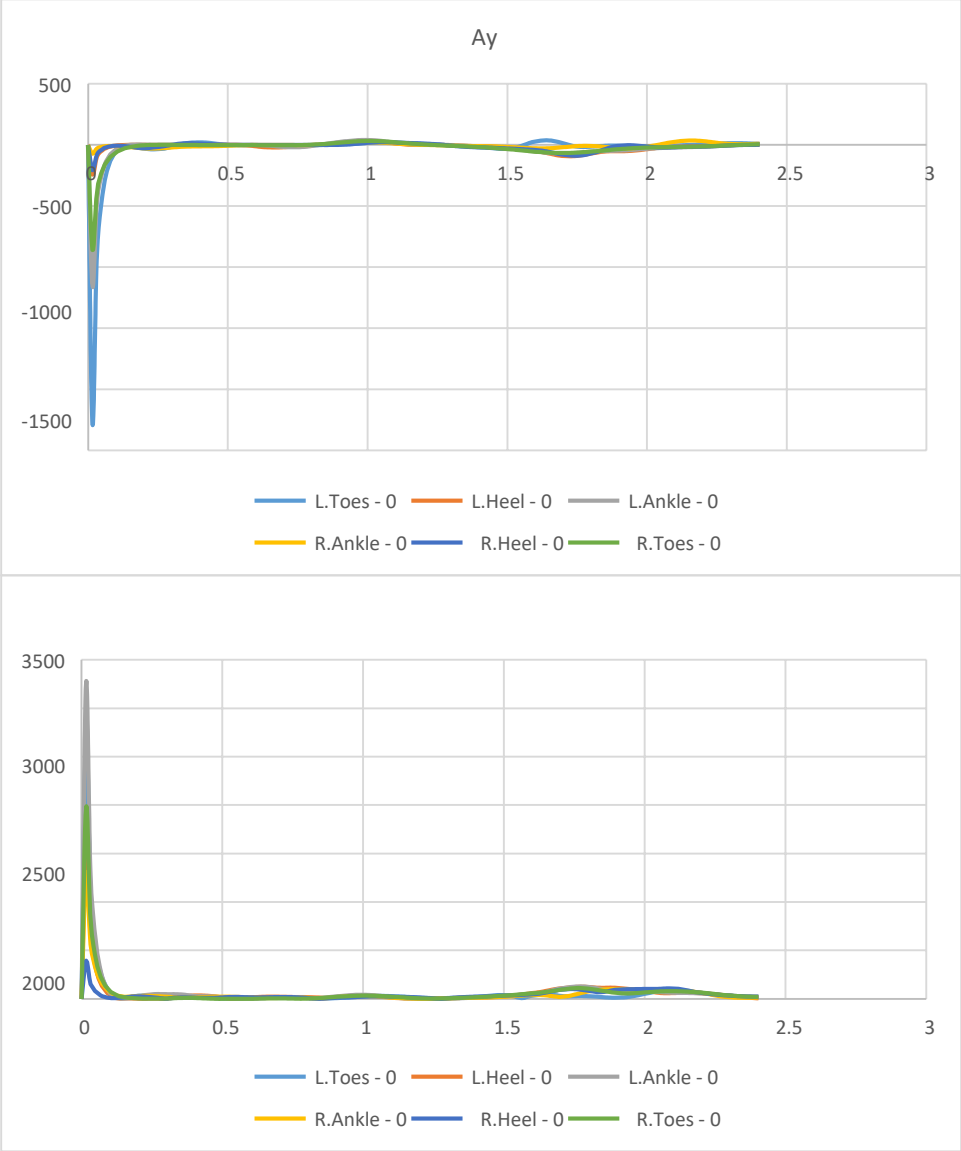


Figure (9) Kinematic variables under study Professional Pointe

7/2 Discussion of the results:

7/2/1 Discussion of the results of the first Question:

Which states, "What are the kinematic properties of the lower limb of Le Petit Echappe´ in ballet using the Training Pointe shoes?"

Table (2) and (4) shows the kinematic properties of the skill performance under study using Training Pointe and Performance Pointe, as it is clear from the time distribution of skill performance during its three stages that the third stage

is the most time-consuming, reaching about53% in Training Pointe, and 36% in Performance Pointe of total skill performance time, which is a very close proportion.

The researcher attributes that to the fact that the third stage includes bending the knees to reach the fifth position, with moving the center of gravity of the body backward and performing this movement with a large number of leg muscles, which are the back muscles, which are less powerful and smaller than the front muscles. In agreement with (Ali-Haapala et al., 2020; Lambertet al., 2020; Vera, Barrera, et al., 2020)

The third stage is also the final product of the skill, in which the body is stabilized in a position of balance on the metatarsal of the feet for as long as possible, where jumping skills are among the skills that are used to link the movement of ballet sentences. In agreement with (Zikan, 2019) (Lambert et al., 2020; Mitchell et al., 2020; H. Saleh & Al Henawy, 2019)

While it appears that the least time-consuming stage is the first stage, and the researcher attributes that because it involves descending, which is the beginning of pushing the body up to the work of the Le Petit Echappe´ skill. This is clearly demonstrated by the ability to combine strength and speed while performing the jump skill in question. In agreement with (Fuller et al., 2020; Ko et al., 2020; McGill et al., 2019b)

Table (6) Muscle percentages according to a measure of EMG of Legs

	Muscle		%
1	Right Rectus Femoris		%14
2	Left Rectus Femoris		%23
3	Right Vactus Medialis		%11
4	Left Vactus Medialis		%9
5	Right Sartorius		%14
6	Left Sartorius		%13
	Right Biceps Femroris		

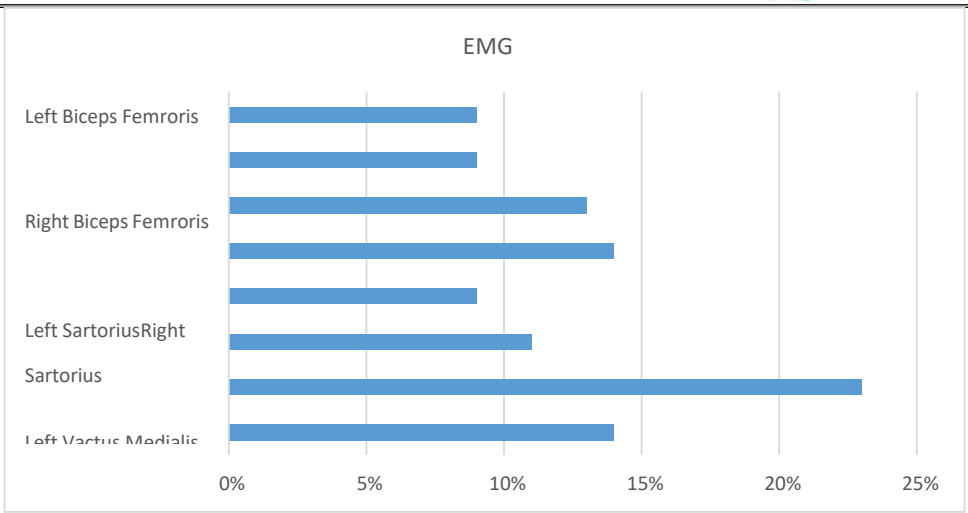


Figure (6) Muscle percentages according to a measure of EMG of Legs

In agreement with (Faria et al., 2013; Kalaycioglu et al., 2020; Phan et al., 2020; Result List: Ballet: Discovery Service for Saudia Digital Library, n.d.)

It is evident from tables (2) and (4) that there is a gradual increase in speed during performance, especially vertical capacity, and the researcher attributes this to that the performanceis carried out on the vertical axis, and that the movement depends on lowering and raising the center of gravity of the body down and up without moving on the horizontal axis. In accordance with (Emery et al., 2019; Martinez et al., 2014; Yetter, 2020)

While it appears that the wheel has increased dramatically and suddenly in the second stageof the stage of performing the skill under study, and the researcher attributes this to that the secondstage includes pushing the body up through the action of a sudden muscle contraction of the working muscles to give it the explosive force necessary to lift the body of the dancer and make achange in the position of the feet In the air, which contributed to the vertical, horizontal and resultant acceleration. In agreement with (Kenny et al., 2019; McGill et al., 2019a; Uygur et al.,2019)

It is also evident from tables (3) and (5) that the angles of the foot under study are not nearly equal, but they are close in size, and the researcher attributes this to the fact that the shoe used in the exercise does not distribute the weight of the body evenly over the feet, as the researcherattributes that to The dancer does not feel comfortable during the performance as the shoe designdoes not help her in performing the skill under consideration.

It is also clear from Table (5) that the angles of the foot under study are completely equal during the three stages of performance, and the researcher attributes this to that the shoe used helpsthe dancer to distribute her mass over the feet evenly, which gives the skill beauty, mastery and fluidity during the performance. In agreement with (Bhakay et al., 2016; Vera, Peterson, et al., 2020) (Almonroeder et al., 2020; Moltubakk et al., 2018)

4/2/2 Discuss the results of the second question:

Which states, "Are there kinematic differences in the two measurements using my Le Petit Echappe´ ballet training Pointe and Performance Pointe shoes?"

Tables (2), (3), (4), (5) showed that there were no differences in the kinematic variables under study between the two measurements using the Training Pointe and Performance Pointe shoes for Le Petit Echappe´ in ballet.

The researcher attributes this to the fact that the dancer's skill level is significantly high, which gives her the ability to perform well while preserving the kinematic variables such as speed and acceleration without an imbalance in the time of skill performance.

In agreement with (Azevedo et al., 2020; Hendry et al., 2015; Swain et al., 2019)

It is also noticed from tables (2), (3), (4), (5) that there is a difference in the angle of the foot during the three stages of performance, and the researcher attributes that difference to the fact that the shoe used Performance Pointe helps the dancer to distribute her mass on the feet evenly, which It gives the skill beauty, mastery and fluidity during the performance.

It also helps the dancer to reach the maximum range of motion of the foot joint through its design that supports the foot of the dancer and opens the way for the foot joint to reach the maximum angle of movement for it. In agreement with (Gorwa et al., 2020; Hopper et al., 2018; Lee et al., 2012; Nunes et al., 2019; Uygur et al., 2019)

5/0 Conclusions

Within the limits of the study objectives, hypotheses, data used and the results presented, the researcher concludes the following:

1/5/1 Determine the kinematic parameters of Le Petit Echappe´'s performance in ballet using theTraining Pointe.

5/1/2 Determine the kinematic parameters of Le Petit Echappe´'s ballet performance usingPerformance Pointe.

5/1/3 Performance with Performance Pointe, loosening the angle of the feet during the three stagesof performance.

1/4/4 Performance with Training Pointe is based on working muscles significantly without inputfrom the used shoe.

5/1/5 Performance using Training Pointe is anti-performance and not helpful, unlike performancewith Performance Pointe.

1/6/5 A critical biodynamic variable in Le Petit Echappe´'s performance in ballet jump (the verticalwheel and the collecting acceleration).

5/1/7 The decisive stage in the performance of Le Petit Echappe´ in ballet with the jump is the second stage, where it is considered as the starting point for the player to push her center of gravityup and jump with the full length of the two men.

5/2 Recommendations:

In light of the results of the study, the researcher recommends the following:

5/2/1 Using the Training Pointe shoes during the general and special physical preparation stageswithout the skill preparation stages.

5/2/2 Use of Performance Pointe shoes during the preparation phases of the training programs. 5/2/3 Accreditation during the process of training Le Petit Echappe´ in ballet on the kinematicparameters extracted from the study.

5/2/4 Focus during the training process on mastering Le Petit Echappe´ in ballet on the second stage of performance.

5/2/5 Reliance on the kinematic properties extracted from the study in building various training programs to improve Le Petit Echappe´'s ballet skill.

5/2/6 Attention during training in Le Petit Echappe´ in ballet in the second stage, provided that the feet touch the ground in the least possible time and as little space as possible to increase the beauty of movement.

5/2/7 Taking into account the working muscles during the process of training Le Petit Echappe´ in ballet.

6/0 References:

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