

Compression of Elbow Angle between Tribal and Non-Tribal School Boys in Acceleration Phase during 100 Meter Sprinting

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DOI: [10.36348/jaspe.2020.v03i10.003](https://doi.org/10.36348/jaspe.2020.v03i10.003)

| Received: 26.09.2020 | Accepted: 07.10.2020 | Published: 10.10.2020

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Abstract

Differences of cultural and physical activity of daily life are found between tribal and non-tribal community in India. Tribal group also called ethnic group of community other than tribal community people call non-tribal people. The present research study was to find out front and rear arm elbow angle and compare them in acceleration phase for tribal and non-tribal school boys. Total 120 tribal and non-tribal school boys were selected as subject. The subject was divided the age groups i.e., 10-11 yrs., 12-13 yrs. and 14-15 yrs. each age group consists 20 tribal and 20 non-tribal boys. The videography was done during 100 m sprinting. The front and rear arm elbow angle analyzed from video graphic movement by Kinovea 0.8.15 Motion analysis software. The average front arm elbow angle of (10-11) yrs., (12-13) yrs. and (14-15) yrs. tribal boys were 77.00⁰, 78.00⁰ and 81.60⁰ whereas non-tribal boys were 78.85⁰, 81.35⁰ and 85.90⁰ respectively. The front arm elbow angle in acceleration phase increased with increase of age for both tribal and non-tribal boys and front arm elbow angle increased towards the 90⁰ tribal and non-tribal sections. Similarly, the rear arm elbow angle for (10-11) yrs., (12-13) yrs. and (14-15) yrs. tribal boys were 112.25⁰, 105.55⁰ and 113.45⁰ whereas non-tribal boys were 111.05⁰, 110.10⁰ and 108.00⁰ respectively. The rear arm elbow angle decreased with increase of age for tribal and non-tribal groups except one tribal group. The rear arm elbow angle was more than the 90⁰ and it occur 105.55⁰ to 113.45⁰ for tribal whereas 108.00⁰ to 111.05⁰ for non-tribal boys. The difference between tribal and non-tribal school boys for front and rear arm elbow angle was not statistically significant at 0.05 level of significant.

Keywords: Sprinting, Elbow angle, Front arm, Rear arm, Tribal boys, Non-tribal boys, Acceleration phase.

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INTRODUCTION

The tribal students are skillful and energetic. They are highly emotional because of sociocultural background, they seem less competitive and have inferiority complex and fear complex which hinders their success at upper level sports events. In india tribal is relating to a group of people or community of people belonging to tribes and the away they are organized. These communities are also called ethnical group of community. The meaning of non-tribal is relating to a community or group of people who are not belonging to tribal community.

Track & Field: Track and field has been around since the start of the Olympics in Ancient Greece in 776 B.C. Specific track events include indoor and outdoor sprints. Indoor sprints range from 50 yards to 500 meters and outdoor sprints are either 100, 200, or 400 meters. Middle distance races range from 800 to 2,000 meters and long distances range from 3,000 to

30,000 meters. The field events include high jump, pole vault, long jump, triple jump, shot put, discus, javelin, and hammer etc. Vertical jump competitions include the high jump and pole vault [1].

“Running a relatively short distance with maximum possible speed is considered as sprinting” [2]. Running or sprinting ability is the most important factor for elite performance in most of the games and sports. In track and field event there are basically two sprinting events: 100 m & 200 m run and Modern concept 400 m run also consider as a sprinting event. The ability of sprinting can be better understand by 100 m sprinting. Speed is defined as “One’s ability to perform successive movements of the same pattern at a fast rate” [3]. Speed may also be defined as “rapidity with which a movement or successive movements of the same kind may be performed by an individual” [4].

The kinematic parameters such as stride length, stride frequency, body lean, front arm elbow angle, rear arm elbow angle, angle of push are the most important factor of sprinting. In the present study the elbow angle i.e., front arm and rear arm elbow angle consider for the study.

The importance of arm action during sprint running has been an ongoing discussion among practitioners. Although some coaches believe that the arms serve to merely provide balance to the rotary momentum of the legs, others believe that the arms are vital to sprint running performance and contribute to propulsive forces [5].

The upper body arms action enhances the performance of sprinting. Bunn, 1972 [6] and Hay, 1993 [7] both qualitative discussed the role of the arm in sprinting as that of balancing the action of the hips. Bunn claimed that a vigorous backswing of arm causes the legs to stride further and help to mention velocity when the legs is fatigue.

From the above discussion arm / elbow angle i.e., front and rear arm elbow angle important factor for

sprinting. For these purpose researcher was to find out front and rear arm elbow angle and compare them in acceleration phase during 100 m sprinting for tribal and non-tribal school boys.

MATERIAL AND METHODS

Total of 120 school boys within the age of 10 to 15 yrs. out of which 60 tribal and 60 non-tribal school boys were selected as subject for present research study. The subject was divided three equal size age group i.e., 10-11 yrs., 12-13 yrs. and 14-15 yrs. Each age group consists of 20 tribal and 20 non-tribal boys. The subjects were collected from same locality at The video graphic data was collected from 100 m sprinting of the subject. The videography of sprinting was done by Nikon D3300 camera and the frequency of the camera was set 60 frames per second. The camera was placed at one-meter vertical height and 6.25 m parallel distance of running away. The arm angle in acceleration phase of 100 m sprinting only consider for present study. The arm angle of the subject was analyzed by Kinovea 0.8.15 Motion Analysis software. The data collecting method shows in Fig-1 and Photograph-1.

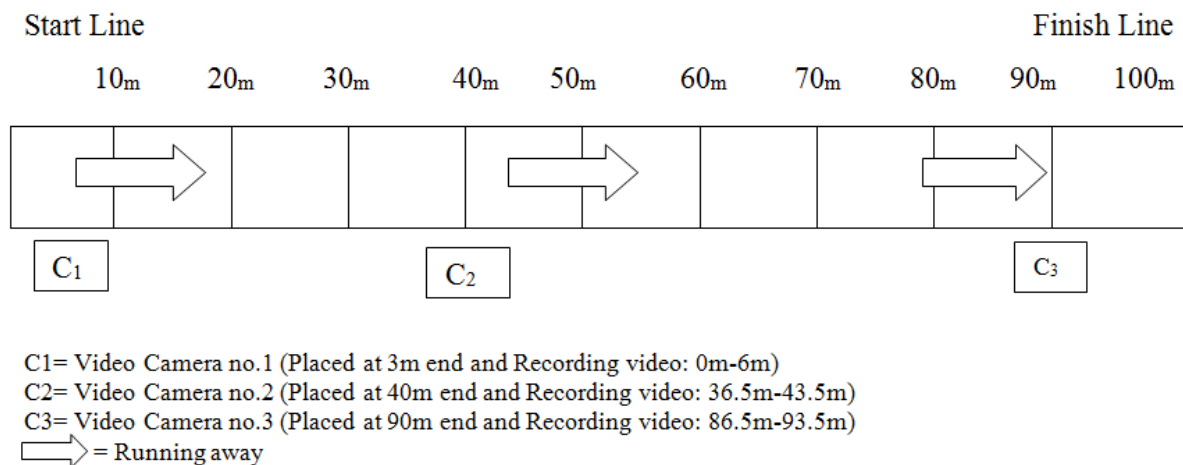


Fig-1: Shows the method of data collection



Photograph-1: Picture during data collection

From the raw video graphic data, the elbow angle including front arm and rear arm elbow angle analyzed by Kinovea 0.8.15 Motion Analysis software.

The sample of front and rear arm elbow angle analysis shows in Fig-2.

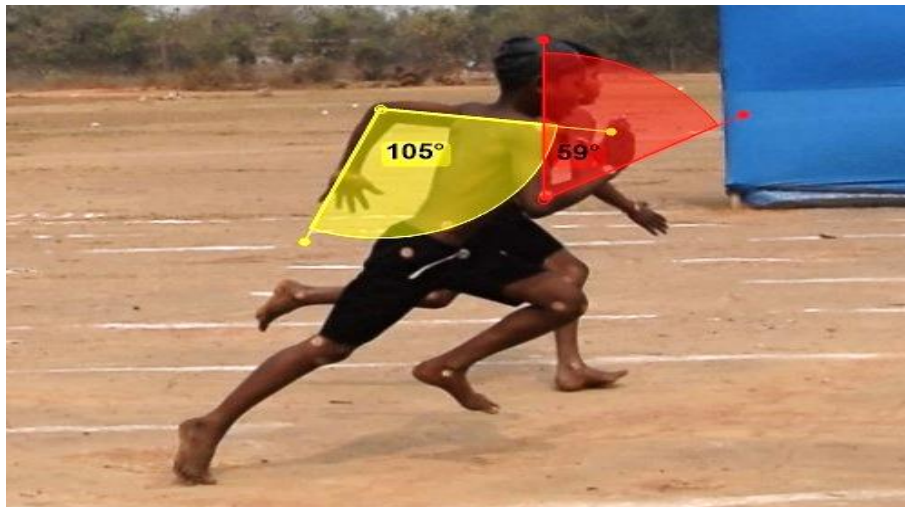


Fig-2: Front and rear arm elbow angle

RESULTS AND DISCUSSION

Keeping the focus of the present study, the elbow angle i.e., front arm and rear arm elbow angle in acceleration phase of 100 m sprinting of tribal and non-

tribal subjects have been analyzed for better understanding.

Mean values of average front arm and rear arm elbow angle in acceleration phase have been presented in Table-1.

Table-1: Front arm and rear arm elbow angle in acceleration phase

Elbow Angle (0°)	Tribal Boys			Non-Tribal Boys			
	10-11 Yrs.	12-13 Yrs.	14-15 Yrs.	10-11 Yrs.	12-13 Yrs.	14-15 Yrs.	
Front Arm	Mean	77.00	78.00	81.60	78.85	81.35	85.90
	SD	± 14.64	± 13.00	± 16.49	± 12.68	± 13.86	± 15.72
Rear Arm	Mean	112.25	105.55	113.45	111.05	110.10	108.00
	SD	± 11.44	± 13.54	± 13.15	± 9.78	± 9.15	± 12.97

It is seen from the table value that the front arm elbow angle of (10-11) yrs., (12-13) yrs. and (14-15) yrs. tribal boys were 77.00° , 78.00° and 81.60° whereas non-tribal boys were 78.85° , 81.35° and 85.90° respectively. Similarly, the rear arm elbow angle for (10-11) yrs., (12-13) yrs. and (14-15) yrs. tribal boys were 112.25° , 105.55° and 113.45° whereas non-tribal boys were 111.05° , 110.10° and 108.00° respectively. From the Table-1 it was also observed that the mean values of front arm elbow angle from 77.00° to 78.00° with increase of age from (10-11) yrs. to (12-13) yrs and 78.00° to 81.60° with increase of age from (12-13) yrs. to (14-15) yrs. tribal boys.

Subsequently the mean value of front arm elbow angle from 78.85° to 81.35° increased with increase of age from (10-11) yrs. to (12-13) yrs. and 81.35° to 85.90° increased with increase of age from (12-13) yrs. to (14-15) yrs. non-tribal boys group. It is seen from the table value rear arm elbow angle in acceleration phase for tribal and non-tribal boys is similar for all age groups. The rear arm elbow angle of (10-11) yrs. (12-13) yrs. and (14-15) yrs. tribal boys are 112.25° , 105.55° and 113.45° respectively whereas non-tribal boys were 111.05° , 111.10° and 108.00° respectively.

Testing significant difference of front and rear arm elbow angle for tribal and non-tribal boys.

Table-2: Comparison of mean values of front and rear arm elbow angle in acceleration phase

Elbow Angle (0°)		10-11 Yrs.		12-13 Yrs.		14-15 Yrs.	
		Tribal	Non-Tribal	Tribal	Non-Tribal	Tribal	Non-Tribal
Front Arm	Mean (0°)	77.00	78.85	78.00	81.60	81.35	85.90
	SD (0°)	± 14.64	± 12.68	± 13.00	± 13.86	± 16.49	± 15.72
	t-value	0.42**		0.77**		0.82**	
Rear Arm	Mean (0°)	112.25	111.05	105.55	110.10	113.45	108.00
	SD (0°)	± 11.44	± 9.78	± 13.54	± 9.15	± 13.15	± 12.97
	t-value	0.35**		1.21**		1.29**	
*Statistically significant				**Statistically non-significant			
Significant level = 0.05				Required table value with df-19 = 2.09			

It is seen from the Table-2 that the calculated t-value of front arm elbow angle for 10-11 yrs., 12-13 yrs. and 14-15 yrs. group tribal and non-tribal boys was 0.42, 0.77 and 0.82 respectively and calculated t-value of rear arm elbow angle 0.35, 1.21 and 1.29 whereas the

table value was 2.09 (df= 19) at 0.05 level of significant.

From the above information (Table-2) average front arm elbow angle in acceleration phase for tribal and non-tribal boys drawn in Fig-3.

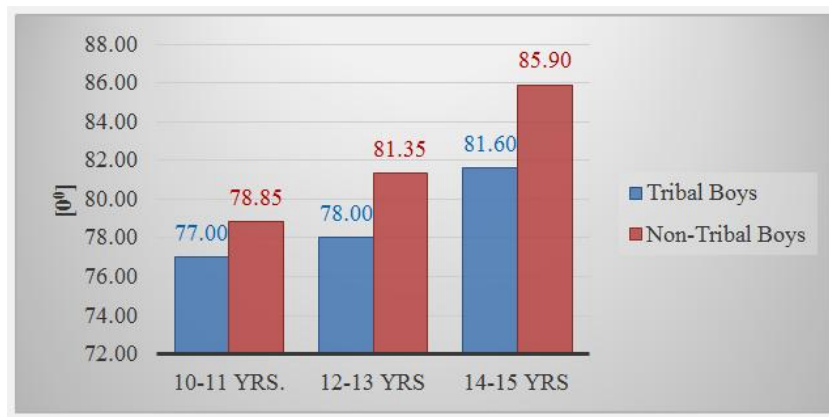


Fig-3: Front arm elbow angle in acceleration phase

From the Fig-3 it was observed that the front arm elbow angle in acceleration phase increased with increase of age for both tribal and non-tribal boys. It is also seen that front arm elbow angle in acceleration phase were higher for the non-tribal group of subject than their tribal counterparts for all age group. The figure also shown the front arm elbow angle increased

towards the 90°. From these results of the figure we can say front arm elbow angle of non-tribal boys was better than the tribal boys in acceleration phase.

From the above information (Table-2) average rear arm elbow angle in acceleration phase for tribal and non-tribal boys drawn in Fig-4.

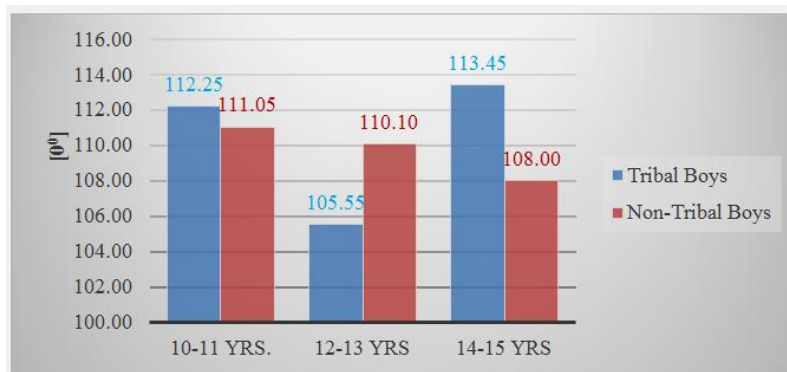


Fig-4: Rear arm elbow angle in acceleration phase

The Fig-4 represents the rear arm elbow angle in acceleration phase for tribal and non-tribal boys. From the figure of rear arm elbow angle for non-tribal

boys was decreased with increase of age. The rear arm elbow angle for tribal boys decreased with increase of age (10-11) yrs. to (12-13) yrs. tribal boys and the rear

arm elbow angle further increased with increase of age (12-13 yrs. to (14-15) yrs. tribal boys. It is also seen from the figure rear arm elbow angle in both case of tribal and non-tribal boys was more than the 90° and it occur 105.55° to 113.45° for tribal whereas 108.00° to 111.05° for non-tribal boys.

The comparison of calculated t-values with Table values of front arm elbow angle and rear arm elbow angle show in Fig 5 and 6.

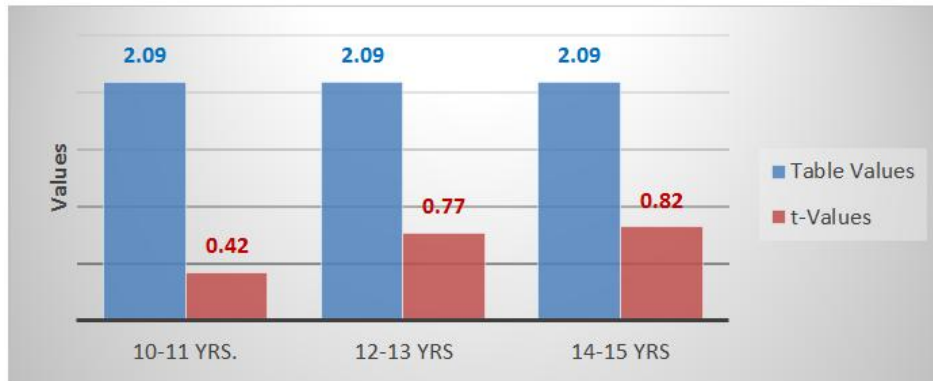


Fig-5: Comparison front arm elbow angle in acceleration phase

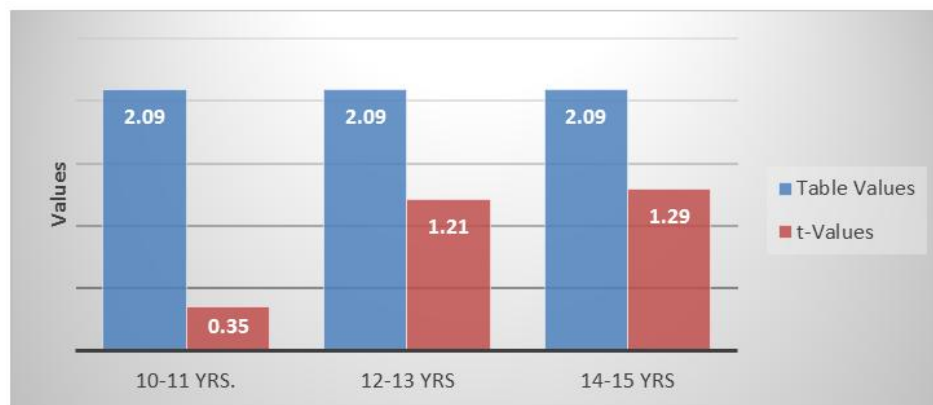


Fig-6: Comparison rear arm elbow angle in acceleration phase

From the above two figure (Fig 5 & 6) testing of significance of the difference between mean values of front arm and rear arm elbow angle in acceleration phase for tribal and non-tribal school boys revealed a statistically not-significant at 0.05 levels for three different age groups.

From present research study also observed that the front arm elbow angle increased with increase of age for both section of tribal and non-tribal school boys and the angle increased towards 90 degrees, it means the front arm elbow angle was more appropriate with increase of age. In the other away rear arm elbow angle occur more or less same for all three age group of both tribal and non-tribal sections. According to Thomas, 2020 [8], "Your front arm angle should be between 60-90 degrees at the elbow and your back arm should be between 90-120 degrees, also at the elbow. If your arm angles fall outside of this range, your running mechanics will be negatively affected. In short, you'll run slower and get tired faster". Some differences of front and rear arm elbow angle was found between tribal and non-tribal counter parts but statistically not-

significant at 0.05 level of significance. It's happened due to the subject they are not trained for sprinting, and their socio economic culture and active participation of daily life similar for both tribal and non-tribal boys. Per haves due to the above reason differences of front and rear arm elbow angle between tribal and non-tribal boys was not found in statistically significant.

CONCLUSIONS

On the basis of results present study following conclusions were drawn:

- 1) The front arm elbow angle for tribal and non-tribal boys in acceleration phase increased with increase of age for both sections and the angle increased towards 90 degrees it means the angle occur more appropriate with increase of age.
- 2) The rear arm elbow angle in acceleration phase for both tribal and non-tribal section more or less same for all age group. The rear arm elbow angle decreased with increase of age except (12-13) yrs. to (14-15) yrs. tribal boys.

The rear arm elbow happened more than 90 degrees for all.

- 3) Both front and rear arm elbow angle in acceleration phase for tribal and non-tribal boys was found some differences. The difference between tribal and non-tribal boys was statistically not- significant at 0.05 level for all age group of subjects.

ACKNOWLEDGMENT

The authors would like to special thanks participants of subject and faculty members of Shyampahari Sri Ramkrishna Sikshapith and Mahabirb Ram Memorial High school. We also thanks to research scholars of Department of Physical Education, Jadavpur University for their assistance in completing this study.

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