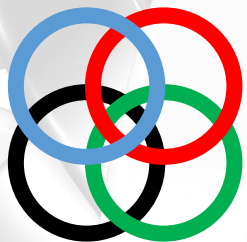
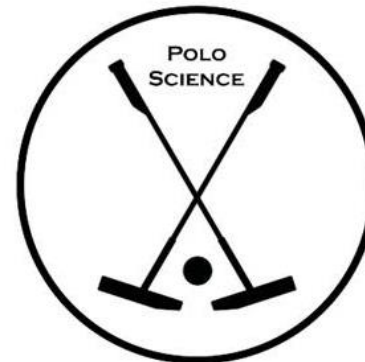


# A review of equestrian polo and a methodology for testing the mechanical properties of the mallet.



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# Introduction.



Literature is scarce for equestrian polo despite its global appeal and the high value of the game in terms of historical reach and investment by the polo community.

- maximum of four players per team on the field at any one time
- nominal field size is 275 m (goal to goal) x 183 m wide
- safety zones of 30 m each end and 10 m each side
- players maneuver about the field on ponies
- use a mallet (stick) to guide the ball (76 to 89 mm diameter)



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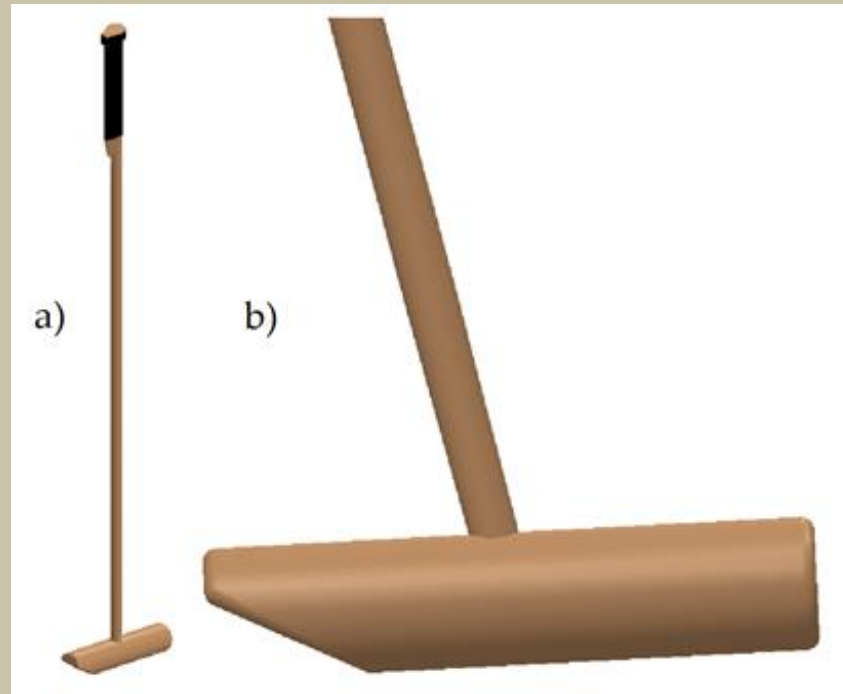
# Approach to the research.

Analysis of play will need to consider interactions such as.

- player–mallet
- mallet–ball
- player–pony
- pony–ground

Early stage research.

- Assessment of the mallet

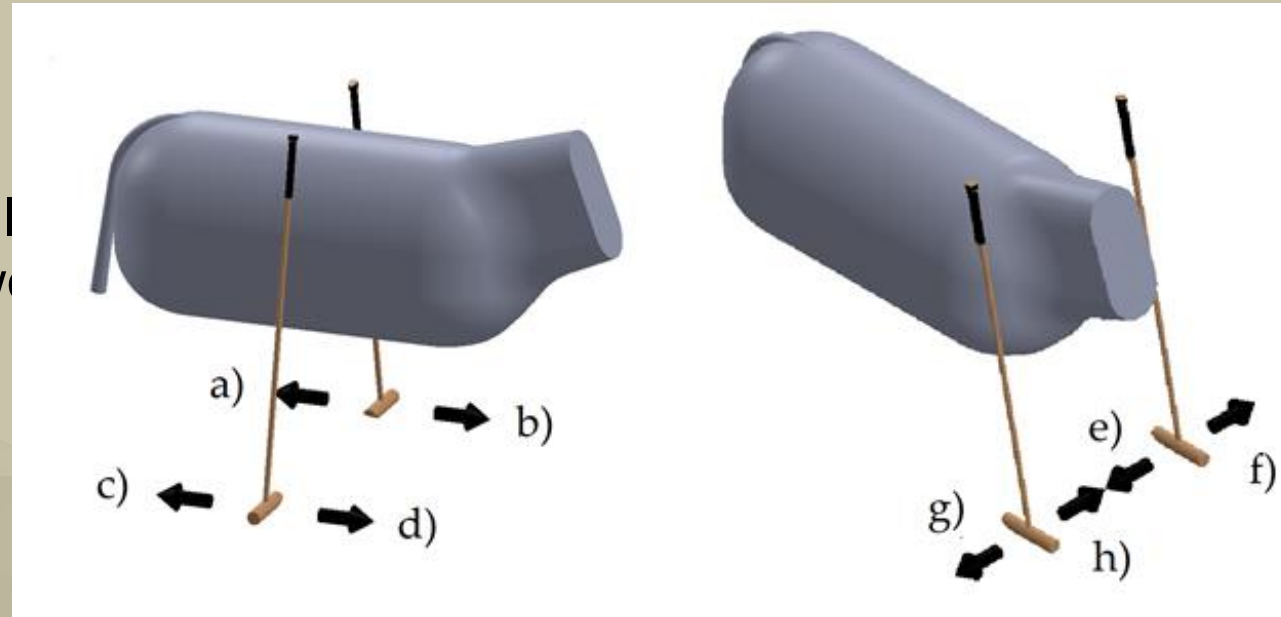


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# Graphical interpretation.

As motion of the  
be logical to test  
(6Dof). This would  
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# Testing methodology.

The first test is gradually applied load perpendicular to the stick

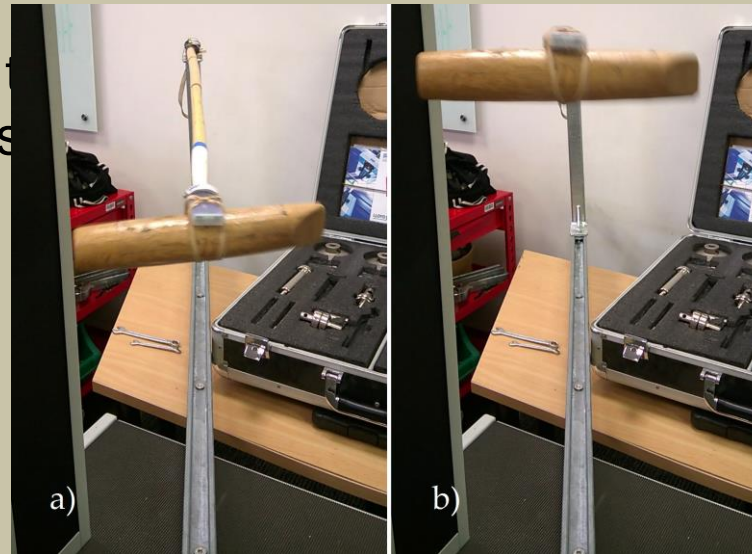
- To determine stiffness of the shaft for both the front and back



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The second test is a measure of the shaft's dynamic test.

- To determine damping of the shaft in both directions.



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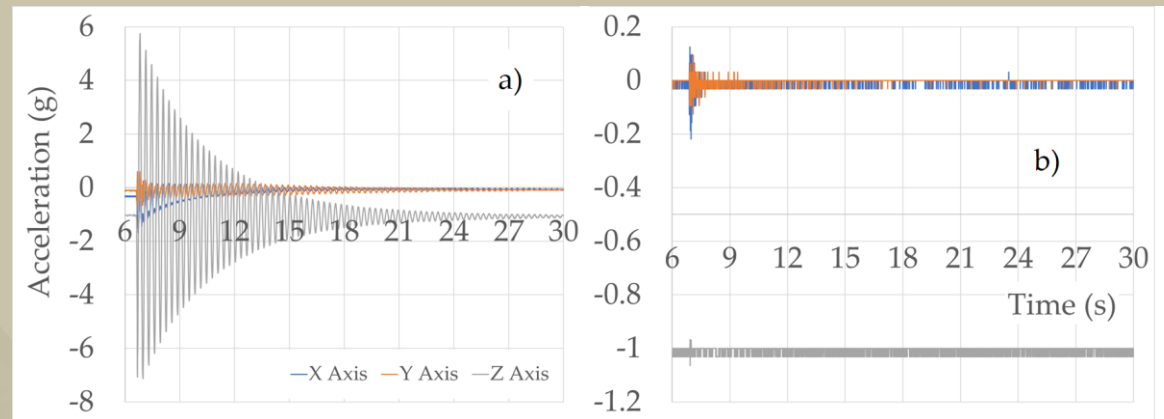
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# Resulting data.

Headspeed (mm/min)	Back of head (Dev)			Front of head (Dev)		
	Max. Load (N)	Deflection (mm)	Stiffness [ $k_{eq}$ ] (N/mm)	Max. Load (N)	Deflection (mm)	Stiffness [ $k_{eq}$ ] (N/mm)
125	23 (0.80)	184.6 (7.52)	0.125	24.4 (2.08)	188.6 (9.12)	0.129
250	23.2 (1.12)	191.4 (2.72)	0.121	23 (0.80)	197.6 (3.84)	0.116
500	24.4 (1.36)	197.2 (2.24)	0.124	23 (0)	197.7 (3.11)	0.116
Ave. $k_{eq}$			0.123 (0.001)			0.121 (0.006)

The (

- Gradual loading
- Dynamic test



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# Discussion/Conclusion.



As the mallet is made using natural material there is high likelihood for variability.

Static testing produces a stiffness value ( $k$ ) and dynamic testing will produce a damping coefficient ( $c$ ).

The quantitative measures for the properties removes the subjective nature of assessment and will aid in the prescription of sticks for the individual.



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# Questions please?



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- George Wood & Wood Mallets, Hawkes Bay, New Zealand.

## References.

- Cited in the full paper (ISEA 2020 Proceedings)

